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Report of the

EXPERT CONSULTATION ON LOW-COST FISHERIES MANAGEMENT STRATEGIES AND COST RECOVERY

Georgetown, Guyana, 4–7 September 2007

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EXPERT CONSULTATION ON LOW-COST FISHERIES MANAGEMENT STRATEGIES AND COST RECOVERY

Georgetown, Guyana, 4–7 September 2007

compiled by

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PREPARATION OF THIS DOCUMENT

This document is the final report of the FAO Expert Consultation on Low Cost Fisheries Management Strategies and Cost Recovery that was held in Georgetown, Guyana, from 4 to 7 September 2007. Financial support for the Expert Consultation was provided by the FAO FishCode Programme through the FishCode Trust (MTF/GLO/125/MUL).

The purpose of the Expert Consultation was to generate practical guidance regarding the range of funding arrangements that are available for funding fisheries management as part of FAO's ongoing efforts to assist countries in the implementation of the FAO Code of Conduct for Responsible Fisheries.

This document includes the recommendations and guidance as well as coverage of the discussions regarding key components of successful fisheries management regimes, the means to fund and deliver fisheries management services, and the different ways to put these practices into effect. The document also includes the extensive background documentation prepared for the Expert Consultation about the best practices in sustainable, effective and cost effective fisheries management as well as six case studies expanding on how different countries finance fisheries management.

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ABSTRACT

The *Expert Consultation on Low Cost Fisheries Management Strategies and Cost Recovery* was intended provide practical information, guidance and recommendations useful to agencies interested in examining their fisheries management funding arrangements as part of facilitating more informed choices regarding funding options, the allocation of scarce resources, and improving overall performance.

Fisheries management agencies are typically mandated to achieve a broad range of objectives related to resource conservation, sustainable use and the distribution of benefits derived from fisheries – benefits that can be considerable as has been demonstrated in a number of countries.

The dilemma that often faces countries is that the management to capture long-term benefits often involves considerable expenditure in both transition arrangements and in ongoing management costs. These costs often exceed the funding available to fisheries management agencies through normal government appropriations. This situation is particularly significant in Low-Income Food-Deficit Countries (LIFDCs) where public funding to support the management of fisheries is often limited.

Three key questions were addressed:

- How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?
- Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)? and
- Who is best situated to provide specific fisheries management services (government or private sector)?

Overall, the group recommended that FAO should both develop Technical Guidelines on Funding Options for Successful Fisheries Management and hold an expert consultation to further elaborate the transitional issues of moving to sustainable fisheries, with a view to developing technical guidelines on this complex topic.

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PART I – RESULTS OF THE EXPERT CONSULTATION ON LOW-COST FISHERIES MANAGEMENT STRATEGIES AND COST RECOVERY

RECOMMENDATIONS AND GUIDANCE

Successful fisheries management regimes

1. The group[1] recognized that there are a growing number of international experiences of successful fisheries management that contribute to economic development which provide valuable lessons for the future.
2. The group agreed that there are five main components of successful fisheries management, involving interrelated functions and activities. These components are objectives and policy, legislation and regulations, institutional arrangements and capacity, decision-making process, and applied fisheries management activities (research, administration and management, compliance and enforcement).
3. The group agreed that for these main components to be effective, fisheries management policy should:
    - provide clear direction that is relevant to local circumstances;
    - be elaborated in collaboration with stakeholders where appropriate;
    - provide for sufficient institutional capacity to ensure objectives are met;
    - be supported by political leaders; and
    - have the ability to address and deal with conflicts and often competing objectives.

Fisheries management funding arrangements

4. The group recognized that there is a range of potential arrangements for funding fisheries management.
5. The group recognized that funding decisions are influenced by the overall availability of public resources to the government, the level of priority assigned to the fisheries sector, and the specific fisheries management regime that is used.
6. The group recognized that most countries fund fisheries management through government appropriations.
7. The group agreed that cost recovery is a desirable tool for funding fisheries management services as it improves accountability and efficiency.
8. The group agreed that costs are best attributed to those who primarily benefit and that costs need to be directly linked to defined services for effective recovery.
9. The group agreed that cost recovery in marginal fisheries may be inappropriate without management reform designed to improve financial viability.
10. The group recognized that there are very few examples where service provision is formally delegated from government to the private sector but concluded that this approach has considerable potential.
11. The group recognized that there is a range of mechanisms for generating government revenue (e.g. access, license, and other fees) and agreed that these should be distinguished from cost recovery when they are not directly linked to specific services.
12. The group agreed that care should be taken in applying revenue-generating mechanisms because the way they are applied will affect the behaviour of resource users.
13. The group noted that self funding provides an opportunity for groups to increase their involvement in fisheries management and is an effective approach, when used appropriately, because it ensures that delivery of services is directly accountable to those who pay for the services.

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[1] The term "group" is used to refer to the participants in the Consultation.

14. The group noted that partnerships and collaborative arrangements have the potential for galvanizing support to address particular fisheries management issues.

15. The group emphasized that donor assistance is of critical importance to underpin fisheries management activities, while recognizing the risk of creating dependency on external funding and diverting attention from critical national policy objectives.

Delivery of fisheries management services

16. The group recognized that the essential roles for government to perform in fisheries management are to set policy; establish and implement laws; undertake some elements of enforcement; ensure quality of services provided through outsourcing, and to establish access and allocation arrangements.

17. The group agreed that there is flexibility in the provision of all other fisheries management services and that the private sector may be well suited to deliver many of these services.

18. The group recognized that fisheries management funding is often both scarce and difficult to reallocate and also identified opportunities and mechanisms for prioritizing and allocating financial and human resources (e.g. risk-opportunity analysis, market-based approaches, etc.).

Strategy development

19. The group recognized the importance of having a robust strategy for achieving cost-effective fisheries management and noted the difficulties of generating support to introduce necessary management changes.

20. The group noted that many countries currently have a development focus targeted at increasing fish production, whereas the move to sustainable fisheries often requires the imposition of constraints that limit harvests.

21. The group identified a variety of conditions (e.g. changes in stock status, political changes, responding to natural disasters, etc.) that may provide the impetus to embark upon fisheries management change and outlined a series of steps that may be followed when developing and implementing a fisheries sector strategy.

Transition considerations

22. The group recognized the importance of an effective transition process when fundamental changes in fisheries management are considered and noted that this process is complex and may take many years.

23. The group agreed on a range of factors to be considered when developing a plan for transitioning to successful and cost-effective fisheries management and noted that the sequence of transitional steps is critical and dependent on the particular conditions and circumstances of the country concerned.

24. The group agreed that transitional issues are of such fundamental importance that the topic warrants further elaboration.

Overall

25. The group recommended that FAO should:

- develop Technical Guidelines on Funding Options for Successful Fisheries Management; and
- hold an Expert Consultation to further elaborate the transitional issues of moving to sustainable fisheries, with a view to developing technical guidelines on this complex topic.

PART II - REPORT OF THE EXPERT CONSULTATION ON LOW-COST FISHERIES MANAGEMENT STRATEGIES AND COST RECOVERY

INTRODUCTION

Fisheries management agencies are typically mandated to achieve a broad range of objectives related to resource conservation, sustainable use and the distribution of benefits derived from fisheries. The benefits that can be derived from management of fish stocks for long term sustainability can be considerable as has been demonstrated in a number of countries.

However, the dilemma that often faces countries is that such management to capture long term benefits often involves considerable expenditure in both transition arrangements and in ongoing management costs. These costs often exceed the funding available to fisheries management agencies through normal government appropriations. This situation is particularly significant in Low-Income Food-Deficit Countries (LIFDCs) where public funding to support the management of fisheries is often limited.

In addition to fisheries management activities, there are a number of emerging initiatives that have the potential to increase the funding pressures faced by fisheries management agencies, including such things as ecosystem management, the Code of Conduct for Responsible Fisheries (CCRF) and associated International Plans of Action, ecolabelling, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

To implement fisheries management, these and other emerging initiatives, there is a growing recognition among fisheries managers and resource economists of the importance of addressing issues associated with the cost of fisheries management activities. For example, the overall performance of a fisheries management programme can be enhanced by making informed decisions concerning the allocation of funds to alternative fisheries management activities, securing stable funding for fisheries management expenditures and considering who can most efficiently provide fisheries management services (government or private sector).

A detailed examination of the funding issues described above can help address one of the most fundamental problems faced by fisheries management agencies worldwide, which is the lack of adequate funding and the many competing uses for the funds that are available.

The primary objective of the Expert Consultation was to provide practical information and tools that will be useful to agencies interested in examining their fisheries management funding arrangements.

It is important to stress that the intent is not to instruct governments and fisheries management agencies on how to allocate their budgets but rather to make available information that can facilitate more informed choices when faced with funding options.

Three key questions were addressed:

- How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?
- Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)?
- Who is best situated to provide specific fisheries management services (government or private sector)?

The following reports were prepared for the consultation:

- Case studies in fisheries management from Ghana, India, New Zealand, Nicaragua and Sweden;
- Best practices in sustainable, effective and cost-effective fisheries management in LIFDCs; and
- Financing fisheries management in LIFDCs.

This Report of the Expert Consultation highlights key findings and conclusions, as well as recommendations for further work. The focus was on practical information that will be useful to agencies interested in examining their fisheries management funding arrangements with a view to improving overall performance.

OPENING OF THE EXPERT CONSULTATION

The Expert Consultation on Low Cost Fisheries Management Strategies and Cost Recovery was held at the Grand Coastal Hotel, Le Ressouvenir, Georgetown, Guyana, from 4 to 7 September 2007 at the kind invitation of the Government of Guyana. The list of experts who attended the Consultation is attached as Appendix B. The experts were selected on the basis of their specialized knowledge. They served in their personal capacities and not as representatives of their respective governments or organizations.

Fisheries experts from Australia, Canada, Ghana, Guyana, India, New Zealand, Nicaragua, South Africa and Sweden participated in the Consultation.

At the official opening of the Consultation, the Acting Chief Fisheries Officer of Guyana, Mr Tejnarine Geer, welcomed the participants, and said that it was an honour for Guyana to collaborate with FAO in hosting the Expert Consultation. He noted that Guyana and countries of the Caribbean region have a duty to ensure that the fisheries resources of the region were utilized and managed in a sustainable manner to support the high consumption of fish and to contribute to the food security.

After welcoming the participants and specially invited guests on behalf of the Director-General of FAO, Mr Jacques Diouf and the Assistant Director–General, Fisheries Department, Mr Ichiro Nomura, Mr Bisessar Chakalall, Secretary of the Western Central Atlantic Fishery Commission, took the opportunity to express sincere appreciation and thanks to the Government of Guyana for hosting the Consultation and for their kind hospitality. He mentioned that the Consultation was about the challenges being faced by developing countries, like Guyana, in funding fisheries management activities. He noted that one of the main objectives of the Expert Consultation was to explore cost effective funding arrangements that have the potential to support fisheries management activities in Low-Income Food-Deficit Countries (LIFDCs) and developing countries and the application of appropriate funding arrangements to support essential fisheries management activities.

The Minister of Agriculture of Guyana, Honourable Robert Persaud, then welcomed the participants and guests to the opening session of the Consultation on behalf of his Government. He noted that according to FAO the overall potential from wild capture fisheries from the oceans has been reached. Given the tremendous increase in world trade of fish and fisheries products, the current high demand may only be met through a more cautious and effective fisheries management, aimed at maintaining fully exploited fishery resources and recovering those that are overexploited or depleted and increasing aquaculture production. The Minister said that even though Guyana could further exploit its marine fishery resources it was now placing more emphasis on the development of aquaculture with the active participation of the private through the recently formed Aquaculture Association of Guyana.

The Minister mentioned that fish is the major source of animal protein in Guyana. It is estimated that per capita annual consumption of fish was nearly 46 kg, about three times the world average. The fishery sector employs about 9 000 fishers and fish farmers and some 5 800 persons in processing and marketing. Around 15 000 jobs thus depend directly on fisheries, and many more people benefit indirectly from fishing-related occupations, such as boat building, supply and repair.

In inviting the Expert Consultation to provide him with comments on the recently completed draft Fisheries Management Plan (FMP) for Guyana, which will be submitted to Cabinet in the near future, the Minister recognized that it was not the remit of the Consultation. He wished the Consultation success in its deliberations and indicated that he looked forward to receiving the report of the meeting since it may be applicable to the draft FMP of Guyana.

ELECTION OF THE CHAIRPERSON

The participants in the Expert Consultation elected Mr M. Arbuckle as Chairperson.

ADOPTION OF THE AGENDA AND TIMETABLE

The Expert Consultation adopted the Agenda as presented in Appendix A to this report.

DISCUSSION

Successful fisheries management regimes

It was noted that many fisheries worldwide have experienced a similar evolution, that is moving from a situation of abundant resources to a period of expansion characterized by the use of more effective fishing technology and increasing harvests, followed by stock decline and fishery closures. In these instances, which were experienced in both developed and developing countries, the conduct of fisheries often places a burden on taxpayers rather than making a positive contribution to national economies, including food security and poverty reduction.

In contrast, in some instances, fisheries have operated for a long time on a sustainable basis and have contributed to economic development rather than detract from it. In many jurisdictions the generation of wealth from fisheries through the creation of resource rents is a central feature of their success. Such wealth creation has particular importance in LIFDCs as it can provide a source of revenue to underpin economic development if reinvested in the national economy. The extent to which fisheries are able to operate on a sustainable basis, producing social and economic benefits, is directly linked to the fisheries management arrangements that govern fisheries.

The group concluded that the components of successful fisheries management involved interrelated functions and activities in five areas identified as:

- Objectives and policy;
- Legislation and regulations;
- Institutional arrangements and capacity;
- Decision-making processes; and
- Applied fisheries management activities (research, administration and management, compliance and enforcement).

The performance of any fisheries management regime is determined by the specific features associated with each of the five components within the existing social, political and cultural context. It was agreed that the presence of these components, listed above, is not sufficient to ensure success in managing fisheries. For example, good policy and legislation will not go far without the institutional capacity to implement it.

To be effective, fisheries objectives and policy should be developed in collaboration with stakeholders, provide clear direction that is relevant to local circumstances, have sufficient institutional capacity to ensure objectives are met, and be supported by political leaders, and have the ability to address and deal with conflicts and often competing objectives. In addition, the direction set by policy has important consequences with respect to clarifying the roles and responsibilities of various interests associated with the fishery (e.g. parties involved in co-management agreements; conservationists, other industries), enabling effective management and determining the types of funding arrangements that can potentially be brought to bear.

Fisheries management is a dynamic process that is subject to ongoing review, monitoring and modification. An effective fisheries management regime that promotes resource sustainability creates incentives for fishers to participate in fisheries management to protect their longer term interests. The establishment of appropriate fiscal systems and access rights are an important factor in this regard.

Fisheries management funding arrangements

Worldwide, it is common for governments to fund fisheries management activities through normal appropriations although there are increasing numbers of examples whereby fisheries management is funded by alternative arrangements. The group recognized that funding decisions are influenced by the overall availability of public resources to the government, the level of priority assigned to the fisheries sector, and the specific fisheries management regime that is used.

The group considered the following approaches to funding:

- Government funding and delegation of responsibilities:
    - Appropriations;
    - Cost recovery;
    - Delegation of responsibilities; and
    - Mechanisms for revenue generation;
- Self-funding;
- Partnerships and collaborative agreements; and

- Donor assistance.

Government funding

Appropriations

The group noted that government funding is normally conducted through an appropriations process. This is to ensure appropriate accountability of government agencies for expenditure.

Revenue generation, including cost recovery, under such regimes are normally paid into the consolidated fund to reduce conflict of interest between the collection of revenues and the delivery of services. However, this situation, which is necessary for accountability often creates tensions in the process of allocating funds within government given competing political demands. The group noted that careful attention needs to be given to the way revenue generation and service delivery are linked.

It is important to recognize that in addition to normal appropriations, many governments provide subsidies in various forms, such as exemption from taxes, grants and export incentives. It is increasingly recognized that some subsidies exacerbate resource management problems.

Cost recovery

Frequently, in addition to government funding, some countries have a policy of cost recovery where a portion of the fisheries management costs are recouped from specific user groups (e.g. domestic commercial fishers, foreign fishers, recreational anglers).

Cost recovery is distinct from other fees that may be paid to government in that there is a direct link between the fisheries management services and the fee paid by users of the service. The rationale for such cost recovery is that those who benefit from fisheries management activities should contribute to their funding.

The group agreed on a number of points associated with the use of cost recovery. They were:

- Requires a system for measuring the level of fisheries management expenditures by activity and by fishery.
- Promotes efficiency (e.g. cost reductions) in the provision of fisheries management services.
- Increases accountability within fisheries management service providers (government agencies as well as others).
- Should be based on an approach where the costs are attributable to those who primarily benefit.
- Should be sensitive to the ability to pay. Introducing cost recovery in marginal fisheries may not be appropriate without management reform designed to improve financial viability.
- Should be considered in the broader context of government financial administration (e.g. consistency with approach followed in other sectors).

Cost recovery has been introduced successfully when the following conditions existed:

- When introduced coincident with a change in fisheries management that has the potential to increase participants' net earnings and/or additional fisheries management expenditures are required;
- Harvesters have an incentive to pay for certain services (e.g. a service provided by government would otherwise be discontinued or paying for a service will increase net revenues); and
- Harvesters have a significant role in determining how funds are spent (e.g. concept of "user pay, user say").

In conclusion, the group noted that cost recovery can be a desirable tool for funding because it helps generate greater accountability and efficiencies in management, but the group also recognized that it had to be associated with particular services and be affordable.

Delegation of responsibilities

The group noted that there is a distinction between delegation and outsourcing. The latter is common practice, while there are limited examples where governments have formally delegated fisheries management responsibilities to the private sector. Nonetheless, one such example was the administration of the quota registry in New Zealand, where the Fisheries Act 1996 provides for the devolution of some fisheries services to external organizations that then become responsible for ensuring the provision of the services with the agreement of the Minister of Fisheries.

Overall, the group concluded that there is potential for further delegation subject to appropriate standards and in situations where providers have the incentives to deliver the service.

Mechanisms for revenue generation

The group agreed that it is important to distinguish between cost recovery and other methods by which governments generally generate revenue from the fisheries sector when the other methods are not being applied to recover the costs of specific services. Some such examples include:

- Access fees/licence fees;
- Auction of access rights;
- Quota fees or fish landing charges; and
- Export licences and royalties on fish exports/imports.

The above types of charges might be applied by the resource manager (usually government), but the way and extent to which they are applied affect the incentives for users of fisheries services to pay for costs and to operate in a sustainable manner. Creating a capital asset by, for example, auctioning out a resource for a number of years, will create incentives to operate sustainably. In contrast, collecting annual resource rent through a tax does not increase participants' long term interests.

In addition, there are provisions in some countries to direct revenues from certain violations (fines) that may be used to fund fisheries-related activities. The group noted that care needs to be taken in the ways such revenues are utilized to avoid misuse of coercive powers.

Self-funding

The group noted that self-funding provides an opportunity for groups to carry out work in support of fisheries management or produce information either contrary or complementary to the current management.

Such activities might include alternative stock assessments, infrastructure, research, some aspects of compliance such as monitoring, stock enhancement, and so forth. These arrangements work best when the private sector objectives are aligned with those of the government and when the benefits will be returned to the funders. These approaches have the advantage of being directly accountable to those who pay for the services.

Partnerships and collaborative agreements

The group noted the opportunities for arrangements such as partnerships and agreements with universities, twinning[2], in-kind contributions, public-private sector partnerships (e.g. biologist and fisheries management agency) and encouraged their further use. Partnerships, particularly government to government offer good opportunities to transfer knowledge of successful fisheries management experiences.

In general, the group concluded that it is important to be aware of the risk of diverting attention away from core mandates in pursuit of objectives of others (funding capture). In situations where partnerships involve access arrangements and/or joint ventures, there is a need to ensure that both partners to an agreement have sufficient capacity to engage in such agreements.

Donor assistance

The group recognized that donor assistance is often of critical importance to many developing countries to underpin fisheries management activities, particularly when starting the process of building capacity in fisheries management agencies.

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[2] This could be a relationship between an institute in a developing country and a partner in an industrial country, or it could involve several institutes from both developing and industrial countries. The advantages of twinning lay in the extensive, well-organized and potentially long-lasting exchange of information and personnel and in the sharing of facilities that the concept envisions; however, the challenge is in making these linkages viable and durable.

As with partnerships and similar arrangements, there is a risk of funding capture and dependency, and reduced incentive to innovate. In addition, it may encourage countries to use approaches that may not be well-suited to the local management needs[3], may involve inappropriate technology or may inadvertently miss appropriate target groups. Nonetheless it can be useful for facilitating transitions in the way fisheries management is carried out.

Delivery of fisheries management services

Governments have the responsibility for managing fisheries resources; however, there is considerable flexibility with respect to how government exercises this responsibility and in the provision of fisheries management services. The nature and extent of the services provided is influenced by policy.

The group considered that there are some essential roles of government to perform. These roles are to: set policy and establish laws; undertake some elements of compliance (e.g. search and seizure); ensure quality of services provided through outsourcing; and to establish access and allocation arrangements.

The group noted that, where provided by government, the delivery of fisheries management services can be accomplished more effectively if done in cooperation with stakeholders. Stakeholders are generally well-positioned to assist with many aspects of fisheries management but often lack the necessary structure to contribute. Building organizational capacity and capability therefore may be necessary. Stakeholder contributions to fisheries management can take many forms – provide advice on some aspects, play an active role in service delivery, assume specific responsibilities, provide funding, etc.

Given the common property nature of fisheries resources, governments tend to play a prominent role in all aspects of fisheries management, yet there is at least the potential for government services, that are not essential to the role of government, to be provided by the private sector.

In recent years, some governments have sought to improve the cost effectiveness of fisheries management by enabling the private sector to deliver many of the services traditionally provided by government agencies. This has involved identifying those services that are well-suited to private sector delivery versus functions that should remain in government. This generally involves establishing formal organizational structures (e.g. a collective organization), hiring skilled staff and carrying out specific activities such as research, administration, management, compliance and enforcement.

Allocation of financial and human resources

The group recognized that the process of allocating scarce funds is particularly vexing given the competing demands for use of such resources and the complexity and inter-relationship between the services being delivered. In this regard it was noted that government budgets tend to be fairly rigid with annual allocations which to a great extent are linked to fixed costs (mainly staff) and which are difficult to reallocate.

The group noted that there may be opportunities to achieve greater benefits if one or more of the following approaches are utilized:

- risk-opportunity based analysis (qualitative or quantitative)[4];
- investment in fisheries management based on where the best return exists;
- where possible, use market-based approaches to allocate scarce resources; and
- by pursuing efficiencies in service delivery, some financial resources may be freed-up to support other activities, for example.

For the above processes to be effective, strong leadership is crucial, both political and organizational, and in both the public and private sector.

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[3] For example, the Dr. Fridtjof Nansen Survey Programme. Whilst this survey programme has been valuable in providing data for certain fisheries (for example, Ghana's demersal stocks), the donor-scheduled timing of the surveys meant that the timing was not optimal for assessing sardinella and pelagic stocks.

[4] It is important that goals are clearly defined if following this approach.

Strategy development

Having discussed the key components of fisheries management, and the means of funding and delivery of fishery management services, the group considered ways of putting these practices into effect.

The group noted that many countries currently have a development focus targeted at increasing production from fisheries while the move to sustainable fisheries often requires the imposition of constraints that significantly limit the harvesting sector. Therefore, the group agreed that, at the outset, it is important to reconcile these potentially conflicting objectives (e.g. expansion of employment in the fish harvesting vs. controlling the total harvest to achieve sustainability).

The group identified a variety of conditions that may provide the impetus to embark upon a new fisheries management strategy, including the following:

- responding to events such as natural disasters or the collapse of a fish stock and improvements and changes in knowledge about the state of the environment or the fish stock;
- anticipating a change in fishery conditions (e.g. reduced stock availability, increased cost of harvest inputs such as fuel, declining fish prices, etc.) and reacting in a manner that positions the fishery for long-term sustainability;
- taking advantage of an opportunity to derive greater benefits from the fishery through a change in the management approach. In these situations, the impetus can come from government or the private sector;
- taking advantage of outside assistance;
- responding to political changes;
- attempting to comply with international commitments and norms, such as UNCLOS[5]; and
- responding to market requirements such as health certification and ecolabelling.

In addition, the group agreed that the transition to a best-practice framework needs to have a long-term focus based on successful examples. With this in mind, the development of a strategy can follow a somewhat generic process (outlined below), although the specific features will vary depending on the circumstances of the country.

It was agreed that the scope of the fisheries strategy needs to be clarified early in the process. For example, the challenges are greatest in countries with poor governance where the necessary political, legal, financial and administrative infrastructure is inadequate. In these situations, the group agreed that work may be required on those elements first and the skills required to undertake this work (e.g. legal and financial experts) are generally different than those needed to develop a fisheries strategy.

A brief overview of the generic steps that may be followed in developing a fisheries strategy is presented below, although the group noted that this is not exhaustive and is context dependent.

- A key element in developing a fisheries sector strategy entails seeking political support;
- Ideally, a highly skilled individual should be identified to play a lead role in developing a fisheries sector strategy for the country. This individual would need a good understanding of overall government priorities, the fisheries sector and fisheries stakeholder perspectives;
- In addition, an independent technical expert or institution could be identified to assist in the strategy development process. This expert would have experience in fisheries management and international assistance (e.g. organizations and programmes that may support the fisheries sector);
- A proposal to develop a national fisheries sector strategy should be developed with the assistance of the individual(s) and/or institutions identified above in conjunction with political leaders, government officials and stakeholders in the country concerned. The proposal should identify key problems and opportunities associated with the fishery. To be effective, the proposal should clearly articulate the following:

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[5] 1982 United Nations Convention on the Law of the Sea of December 1982

  - general policy context for the country;
  - existing policy, legal and organizational framework;
  - current state of the fishery and past management performance;
  - the outlook under the current fisheries management regime, including most serious problems;
  - opportunities to improve the performance of the fishery to meet policy objectives;
  - options to address the problems and take advantage of opportunities, including an impact analysis for each option; and
  - recommendations on developing a national fisheries strategy and the main elements of the proposed strategy.

If there is political support to proceed, then work should begin on the development of a fisheries sector strategy, as follows.

- A small team should be formed to draft the fisheries sector strategy. In addition to the experts identified above, the team should include such other specialists as necessary, depending on the apparent problems.
- The strategy for the fisheries sector should include objectives, priorities and desired outcomes and be developed in conjunction with stakeholders.
- If necessary, a broad consultative process should be launched to establish a common vision of a sustainable and efficient fisheries regime is and how it can be achieved. Examples of successful fisheries management should be provided to help focus the discussion.
- Where possible, agreement should be sought on the main objectives that should be pursued in managing fisheries.
- The draft comprehensive strategy should include the main building blocks to underpin successful fisheries management and a transitional pathway to achieve this outcome.
- Political endorsement for the draft strategy is vital even if this necessitates subsequent modifications as necessary.

The overall approach adopted involves developing a clear plan and utilising scarce resources to support implementation of the plan. In this way funding decisions will be linked to objectives, priorities and desired outcomes. The strategy will serve as an overall guide for the fisheries sector and serve as a basis for engaging funding partners and fisheries stakeholders (including government) in its implementation.

Transition considerations

The group noted that, despite international principles, laws, guidelines and information on the performance of various fisheries management approaches, many fisheries worldwide are not sustainable and/or economically viable.

This situation persists, in part, due to constraints and difficulties with moving from one fisheries management regime to another. The transition usually entails significant impacts on those associated with the fishery (e.g. on fishermen, processors, fish traders). As a result, quite often changes to fisheries management are vigorously resisted, particularly if fishing is a critical activity, if change devalues investments or where fish is a vital source of protein in the community.

Given these challenges, the group identified a range of factors to be considered when developing a plan for transitioning to successful fisheries management:

- The state of the political and economic environment. Countries that have weak or poorly developed institutional frameworks will require different transitional strategies than those with more developed frameworks.
- Supporting institutions and the capacity for implementation. It is important that appropriate institutional arrangements, administrative systems, and skills are present to support and implement change.

- Continuity and commitment in leadership. Strong leadership and commitment of all parties involved are needed as part of implementing a transition plan because the process can be lengthy and challenging.
- Appropriate and ongoing participation of stakeholders. Providing stakeholders with the opportunity to engage in the process and to influence the outcome is essential to increase the legitimacy of the process and to raise the level of acceptance of the final outcome.
- Recognition of extensive commitment and time. Successful implementation will take time, and international experience has shown that implementation may occur over as much as 15 to 20 years.
- Consideration of livelihood impacts resulting from management change. There are significant safety net issues, and it is important to mitigate the impacts on those negatively affected by changes, especially those with few alternatives for self-reliance.
- Conflict resolution. Given that many individuals have a strong vested interest in the status quo or hold opposing views on what changes might be appropriate, conflict resolution mechanisms need to be in place.
- Funding. Funding is vital for supporting both the process, (e.g. consultations), and consequences of change (e.g. vessel capacity reductions and alternative livelihood training).

The group agreed that, given both their complexity and their importance for realising the goals of a strategy, these factors would need further elaboration.

ADOPTION OF THE REPORT OF THE EXPERT CONSULTATION

The Report was adopted on 7 September 2007.

CLOSING SESSION OF THE EXPERT CONSULTATION

During the last day of the Expert Consultation, the experts adopted the *Recommendations and guidance* (found in Part I of this report).

The Chair thanked the participants for their hard work and inputs over the 4 days of the Expert Consultation and noted that the complete final report would be circulated for their approval and adoptions.

Mr M. Arbuckle closed the Expert Consultation on Friday, 7 September 2007 at 18.00 hours.

APPENDIX A

Agenda and timetable

Tuesday, 4 September 2007

Morning: 9.30–12.00 hours

1. Opening of the Consultation

2. Appointment of Chairperson

3. Adoption of the agenda and timetable

4. Overview presentation
    - Objective of the Expert Consultation
    - Key issues and specific questions to be addressed

Afternoon, 14.00–17.30 hours

5. Successful fisheries management regimes
    - Presentation of the main components found in successful fisheries management regimes and selected examples of best practices
    - Group discussion to further elaborate definition of a successful fisheries management regime and identify additional best practices
    - Summarize main findings

Wednesday, 5 September 2007

Morning: 9.30–12.00 hours

6. Fisheries management funding arrangements
    - Presentation of alternative funding arrangements and best practices
    - Group discussion, including cost recovery, co-management and donor assistance
    - Summarize main findings

Afternoon: 14.00–17.30 hours

7. Delivery of fisheries management services
    - Presentation of alternative delivery arrangements and best practices
    - Group discussion, including potential delegation of certain fisheries management responsibilities to the private sector
    - Summarize main findings

Thursday, 6 September 2007

Morning: 9.00–12.00 hours

8. Transition considerations
    - Presentation of potential steps leading to the adoption of successful fisheries management practices
    - Group discussion, including participant's experience in implementing fisheries management reforms
    - Summarize main findings

Afternoon: 14.00–17.30 hours

9. Strategy development
    - Presentation of potential elements of a strategy to promote improvements in fisheries management particularly in lifdcs
    - Group discussion, including identifying low cost approaches to meeting fisheries management requirements
    - Summarize main findings

Friday, September 2007

Morning: 10.30 hours

10. Adoption of the report
    - Presentation of draft report of the expert consultation
    - Group discussion
    - Adoption of the report

APPENDIX B

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APPENDIX C

List of documents

EC LCFM/2007/1	Provisional agenda
EC LCFM/2007/2	Best practices in sustainable, effective and cost effective fisheries management
EC LCFM/2007/3	Financing fisheries management in LIFDCs
EC LCFM/2007/Inf. 1	Provisional list of documents
EC LCFM/2007/Inf. 2	Financing fisheries management – The case of Sweden
EC LCFM/2007/Inf. 3	Financing fisheries management – The case of Nicaragua
EC LCFM/2007/Inf. 4	Funding fisheries management – The case of New Zealand (1985–2004)
EC LCFM/2007/Inf. 5	Financing fisheries management – The case of India (in preparation)
EC LCFM/2007/Inf. 6	Financing fisheries management – The case of Ghana (in preparation)

APPENDIX D

Prospectus

Background

Fisheries management agencies are typically mandated to achieve a broad range of objectives related to resource conservation, sustainable use and the distribution of benefits derived from fisheries. Achieving these objectives involves a number of activities such as scientific research (surveys, data analysis, stock assessment), operational management (consultation, preparing fishing plans, licensing) and enforcement (surveillance, prosecutions). The costs associated with establishing a comprehensive fisheries management regime can be considerable and often exceed the funding available to fisheries management agencies. This situation is particularly significant in Low-Income Food-Deficit Countries (LIFDCs) where there is little public funding provided to support the management of fisheries.

In addition to the normal fisheries management activities described above, there are a number of emerging initiatives that have the potential to increase the funding pressures faced by fisheries management agencies, including:

> *Ecosystem management* – Many jurisdictions are attempting to put into operation the concept of ecosystem management. Adopting an ecosystem approach to fisheries management can require a significant shift in the allocation of funds among activities and/or an increase in overall funding levels (e.g. research on species interactions).
>
> *International Plans of Action* – The Code of Conduct for Responsible Fisheries (CCRF) was adopted by FAO member countries in 1995. Subsequently, international plans of action (IPOAs) were established as voluntary instruments within the framework of the CCRF. Four IPOAs have been developed to date, dealing with seabirds, sharks, capacity and IUU. Member States are encouraged to develop and implement national plans of action to further achieve the objectives of the IPOAs and make these plans an integral part of their fisheries management programmes and budgets.
>
> *Ecolabelling* – The introduction of certification and fish tracking requirements linked to fish market access (e.g. Marine Stewardship Council Certification) is becoming a key issue in many jurisdictions. Not only are there considerable costs associated with certification and tracking processes, in many instances, changes in the fisheries management regime (and additional costs) are required to meet the standards.
>
> *Endangered species legislation* – Some countries have committed to providing a high level of protection to endangered species and as a result face significant incremental costs (e.g. monitoring stock status, developing recovery plans and enforcing harvesting restrictions).

There is a growing recognition among fisheries managers and resource economists of the importance of addressing issues associated with the cost of fisheries management activities. For example, the overall performance of a fisheries management programme can be enhanced by making informed decisions concerning the allocation of funds to alternative fisheries management activities, securing stable funding for fisheries management expenditures and considering who can most efficiently provide fisheries management services (government or private sector). Where funding is extremely limited, it is particularly important to identify low cost approaches to meeting the most important fisheries management priorities.

A detailed examination of the funding issues described above can help address one of the most fundamental problems faced by fisheries management agencies worldwide - the lack of adequate funding and many competing uses for the funds that are available.

Objective of the Expert Consultation

The primary objective of the Expert Consultation is to provide practical information and tools that will be useful to agencies interested in examining their fisheries management funding arrangements. It is important to stress that the intent is not to instruct governments and fisheries management agencies on how to allocate their budgets but rather to make available information that can facilitate more informed choices when faced with funding options.

Three key questions will be addressed:

- ○ How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?
- ○ Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)?
- ○ Who is best situated to provide specific fisheries management services (government or private sector)?

Inputs and outcomes associated with the Expert Consultation

For the Expert Consultation the following reports will be prepared:

> *A number of case studies in effective fisheries management* – Case studies will illustrate practices being utilized by selected fisheries management agencies. Each case study will outline funding issues, including the budget allocation process, expenditures grouped according to common categories, source of funding, service provider, and actions that have resulted in efficiency gains. The case studies will include countries that have introduced cost recovery programme where participants in a fishery (those that derive benefits from access to a public resource) are required to pay a portion of fisheries management costs.
>
> *Best practices in sustainable, effective and cost-effective fisheries management in LIFDCs* – A significant challenge faced by LIFDCs is the extremely limited public funding available to support fisheries management activities. This report will focus on identifying best practices being employed by fisheries management agencies in LIFDCs and assess the potential to use these approaches elsewhere.
>
> *Financing fisheries management in LIFDCs* – Given constraints on public funding in LIFDCs, it is important to explore innovative ways to pay for the most essential fisheries management activities. This report will explore a range of possible financing options that might be pursued by LIFDCs.

The Expert Consultation will produce a final report highlighting key findings and conclusions, as well as recommendations for further work, if warranted. The intent to focus on practical information that will be useful to agencies interested in examining their fisheries management funding arrangements with a view to improving overall performance. In addition, the reference material prepared for the Expert Consultation will be published.

Participants

A small number of experts (8 to 10) will be invited in an individual capacity from different regions. The selection process will target individuals experienced in fisheries management planning and operational activities. In addition, a regional balance in participation will be achieved with emphasis on ensuring that LIFDCs are appropriately represented.

Language

Subject to the concurrence of invited participants, the Expert Consultation will be conducted in English.

Venue and date

The Expert Consultation will be held in Georgetown, Guyana, during the period 4 to 7 September 2007.

Further information

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PART III — BACKGROUND PAPERS

BEST PRACTICES IN SUSTAINABLE, EFFECTIVE AND COST-EFFECTIVE FISHERIES MANAGEMENT

Paul Macgillivray[1]

Macgillivray, P. 2008. Best practices in sustainable, effective and cost-effective fisheries management. In R. Metzner (comp.). Report of the Expert Consultation on Low-cost Fisheries Management Strategies and Cost Recovery. Georgetown, Guyana, 4–7 September 2007. *FAO Fisheries and Aquaculture Report*. No. 853. Rome, FAO. pp. 23–54.

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[1] This document was prepared in 2006 based on the substantive contribution of Mr Paul Macgillivray during his stay in FAO headquarters, Rome, as a Visiting Scientist. The opinions expressed in this document belong to the author(s) and do not reflect necessarily the views of the Food and Agriculture Organization of the United Nations. Current address: Mr Paul Macgillivray, Associate Regional Director General, Fisheries and Oceans Canada – Pacific Region, Vancouver, B.C., Canada.

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ACRONYMS/ABBREVIATIONS

AFMA	Australian Fisheries Management Authority
CPUE	catch per unit effort
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EEZ	exclusive economic zone
FAO	Food and Agriculture Organization of the United Nations
ITQ	individual transferable quota
IUU Fishing	illegal, unreported and unregulated fishing
LIFDC	Low-income food-deficit country
MCS	monitoring, control and surveillance
OECD	Organization for Economic Co-operation and Development
TAC	total allowable catch
UNCLOS	United Nations Convention on the Law of the Sea
VMS	vessel monitoring system

1. INTRODUCTION

1.1 Purpose

Fisheries worldwide are becoming increasingly characterized by an unfortunate paradox. The oceans contain valuable fish resources that are capable of yielding significant economic and social benefits on a sustainable basis; yet many fish stocks are in decline and quite often the conduct of fisheries places a burden on taxpayers rather than making a positive contribution to national economies.

At the same time, throughout the world there are examples of sustainable fisheries that generate significant benefits. The extent to which fisheries are able to operate on a sustainable basis, producing social and economic benefits, is directly linked to the fisheries management arrangements that govern the particular fishery. Accordingly, this report identifies best practices in meeting fisheries management requirements and assesses the potential to use these practices more broadly.

The approach is to examine in detail the conditions and actions that have produced positive fisheries management results, thereby drawing on the experience of some countries to learn about what might work elsewhere. Particular attention is paid to the significant challenge faced by Low-Income Food-Deficit Countries (LIFDCs)[2] where there is extremely limited public funding available to support fisheries management activities.

1.2 Background

This report was written in preparation for an FAO Expert Consultation on Low Cost Fisheries Management Strategies and Cost Recovery. The consultation was designed to address the following three key questions:

- How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?
- Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)?
- Who is best situated to provide specific fisheries management services (government or private sector)?

The FAO Code of Conduct for Responsible Fisheries (the Code) provides a comprehensive description of fisheries management requirements, including the legal and institutional framework for responsible fisheries. Thus, the Code is an extremely useful reference for governments and fisheries management agencies in designing their fisheries programmes.

It is recognized that full implementation of the Code is a long-term objective for many LIFDCs due to funding constraints. This point is noted in the Code, which states:

> *"5.1 The capacity of developing countries to implement the recommendations of this Code should be duly taken into account.*
>
> *5.2 In order to achieve the objectives of this Code and to support its effective implementation, countries, relevant international organizations, whether governmental or non-governmental, and financial institutions should give full recognition to the special circumstances and requirements of developing countries, including in particular the least-developed among them, and small island developing countries. States, relevant intergovernmental and non-governmental organizations and financial institutions should work for the adoption of measures to address the needs of developing countries, especially in the areas of financial and technical assistance, technology transfer, training and scientific cooperation and in enhancing their ability to develop their own fisheries as well as to participate in high seas fisheries, including access to such fisheries."*

Similarly, challenges faced by developing countries in meeting new market related requirements have been recognized. For example, the FAO Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries states:

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[2] Refer to Annex 1 for a list of Low-Income Food-Deficit Countries.

> *"6. In accordance with Article 5 of the Code of Conduct for Responsible Fisheries, and recognizing that all countries should have the same opportunities, and in view of the special conditions applying to developing countries and countries in transition and their important contribution to international fish trade, it is acknowledged that in order to benefit from applying ecolabelling schemes, states, relevant intergovernmental and non-governmental organizations and financial institutions should provide developing countries and countries in transition with financial and technical assistance to develop and maintain appropriate management arrangements that will allow them to participate in such schemes. Such assistance should also consider direct support towards the often high costs of accreditation and certification. Development agencies and donor institutions are encouraged to support FAO in facilitating financial and technical assistance to developing countries and countries in transition."*

While it is generally recognized that developing countries require assistance in establishing sustainable and effective fisheries management regimes, the challenge is to identify the most essential fisheries management requirements and how they can be met most effectively. Thus, this report examines the features associated with effective fisheries management and identifies best practices currently in use.

2. OVERVIEW: FISHERIES MANAGEMENT REQUIREMENTS

This section describes the key elements of a responsible fisheries management regime. Managing fisheries effectively involves a number of elements that are grouped under five headings. The intent is to outline a basic fisheries management framework that generally underpins effective and responsible fisheries regime. The framework is structured as follows:

- Objectives and policy
- Legislation and regulations
- Institutional arrangements and capacity
- Decision-making process
- Applied fisheries management activities (research, administration and management, compliance and enforcement)

A brief overview of each of the elements follows.

2.1 Objectives and policy

Effective fisheries management regimes have a clear sense of purpose, typically articulated through a policy statement that includes objectives for the fisheries sector. The objectives and policy provide overall direction on the purpose of fisheries management and how it will be conducted. Where appropriate, a country's fisheries sector policy should be aligned with other areas of national policy (e.g. food security). In addition, national policy must be consistent with international laws and obligations (e.g. UNCLOS, CITES, etc.).

Having a comprehensive fisheries policy can be very helpful in drawing attention to fisheries sector priorities within the broad national context and can form the basis for international assistance (e.g. technical assistance, grants, loans, etc.).

In developing policy objectives, the following factors should be considered:

- Policy objectives should be realistic, attainable and have the support of the political leadership to effectively provide guidance to fisheries managers. Potential problems include having a list of "motherhood" objectives that provide little real direction or having policy objectives that are unlikely to enjoy political support when challenged.
- Operational policy plays a valuable role in guiding how general policy objectives will be attained. For example, general policy objectives typically refer to conservation and sustainable use. Operational policy provides guidance on how to achieve these objectives (e.g. biological reference points such as maximum sustainable yield [MSY] or maximum economic yield [MEY]).
- Recognize potential trade-offs between objectives and, in those instances, the policy framework should provide direction on priorities – i.e. is one objective more important than another or should there be a balanced approach to pursuing competing objectives. For example, there may be a conflict

between the objective of generating economic returns from the fishery and that of providing employment opportunities in rural areas. Direction on policy objectives is typically based on political and social factors in a given country.

- Typically, policy objectives are common to an entire jurisdiction. However, in some instances, regional or community policies may be developed within the national context or provision may be made for differences in regional or community application of the policy objectives. When this happens, it is important to be clear and transparent regarding differences.

Box 1

Common components of fisheries management policy frameworks

Conservation

- Conservation involves protecting fish, fish habitat, biodiversity and ecosystems by controlling fishing and related activities.
- Biologically-based conservation objectives do not stand alone but rather represent a necessary underpinning for the attainment of other objectives described below.

Sustainable use

- Refers to extracting harvestable surpluses of fish in a manner that ensures fish are available for future generations (target and incidentally-caught fish) and that the fish habitat remains productive.

Economic and social benefits

- Fisheries are conducted to generate benefits, including food, income (private and public), employment, foreign exchange, recreational experience, etc.
- The benefits associated with fisheries can be linked to broader national objectives such as food security and poverty alleviation as well as other activities, including post harvest value added.

Distribution of benefits

- Equitable sharing of the benefits derived from public resources such as fish is a major issue in most jurisdictions.
- The distribution of benefits is determined by fish access and allocation arrangements that can be based on many factors, including the recognition of aboriginal rights, encouraging domestic fishing rather than foreign, favouring small-scale fisheries and fishing communities over industrial operations, etc.

Health and safety

- Controls may be put in place to establish proper working conditions for those involved in the fishery sector and to protect the health of those eating fish/fish products.

This overview is not intended to be exhaustive but rather to highlight key policy topics. It is important to note that effective policy tends to evolve over time in response to issues that requires clarification or changing conditions affecting the fishery. Increasingly, fisheries management is being integrated into a broader context, taking into account ecosystem considerations, biodiversity and oceans governance.

The policy topics identified above focus on what fisheries management may be expected to achieve. Examples of policy objectives currently in use and specific policy statements are presented in Section 3.

2.2 Legislation and regulations

Fisheries legislation and regulations provide the legal foundation for all formal activities associated with fisheries management. This legal foundation includes both international and domestic aspects of fisheries management. In fact, international instruments (e.g. treaties and conventions) and domestic legislation do not exist in isolation but rather operate as complementary tools. For example, the 1982 United Nations Convention on the Law of the Sea (the 1982 Convention) established the legal regime that enables costal states to declare 200-mile exclusive economic zones. In turn, the coastal state is bound to implement provisions of the 1982 Convention within its national legislation, including duties and obligations in relation to their EEZs.

Fisheries management world-wide is founded on a number of internationally recognized legal agreements and treaties, most notably the following.

- The 1982 UN Convention on the Law of the Sea.

- The 1993 FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (the Compliance Agreement).
- The 1995 UN Fish Stocks Agreement.
- Agreements and conventions establishing Regional Fisheries Bodies.

In addition, to the "hard law" instruments (legally-binding treaties) described above, a number of "soft law" instruments (non-binding declarations and resolutions) have emerged and currently play a significant role in fisheries management. These include:

- The 1995 FAO Code of Conduct for Responsible Fisheries.
- International Plans of Action elaborated under the Code of Conduct (Management of Fishing Capacity, Conservation and Management of Sharks, Reduction of Incidental Catch of Seabirds in Longline Fisheries, and Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing).
- Ministerial Declarations (made in Rome).
- UN General Assembly resolutions (e.g. on large scale pelagic drift nets).

As noted above, national fisheries legislation should address not only domestic needs but also the duties and obligations at the regional and international levels. Since the specific fisheries management arrangements vary from country to country, so too will the legal and regulatory requirements. That said, there are a number of key elements that are typically found in national fisheries legislation which are described below in Box 2.

Box 2

Main features of fisheries legislation

Definitions – Explain the terms used, including "fishing".

Institutional arrangements – Includes the objective of the fisheries authority (e.g. Ministry, Department, Statutory Authority) and assigns responsibilities (e.g. Minister and senior officials).

Fisheries conservation, management and development – Includes objectives and principles upon which all management decisions are based.

Requirements for fishing and other activities – Includes control of vessels and nationals both domestically and in areas beyond national jurisdiction as well as reporting requirements.

Licensing – Includes the process and requirements for licensing of all activities under the Act, such as fishing, transhipment and processing.

Monitoring, control and surveillance (MCS) – Includes the appointment procedures and powers of officers with MCS responsibilities under the Act and can include enforcement officers, observers, inspectors, auditors and others.

Jurisdiction, procedure, fines, liabilities etc. – Includes a clear description of the jurisdiction of a court both domestically and extending to events and requirements outside the country and its maritime zones in accordance with provisions in international instruments.

Summary administrative proceedings – Includes a system where offences can be dealt with by administrative procedure if a person wishes to plead guilty, pay the penalty and return to fishing or other activity without lengthy court proceedings.

Evidence – Includes evidentiary requirements to facilitate effective and efficient legal proceedings, relating to areas such as the onus of proof, presumptions and certificates of evidence.

Regulations – Empowers the Minister to make regulations covering specific subjects related to the Act.

Summary

- Fisheries legislation provides the legal mechanism (authority) for the implementation and enforcement of fisheries management objectives and obligations.
- Legislation in support of fisheries management is broad in scope, covering local, national and international activities and thus particular attention must be paid to coordinating various acts, including those dealing with post harvesting activities and trade.

- Outdated or ineffective legislation can seriously constrain the actions of a fisheries management authority, limit the potential benefits derived from the fisheries resource and, in some instances, increase the risk of successful legal challenge.

2.3 Institutional arrangements and capacity

The term "institutional arrangements" is used here to describe the framework of rules that apply to a fishery, the processes that are used to achieve the desired outcomes and the organizations mandated to carry out fisheries management functions (e.g. government departments, statutory authorities and other relevant agencies). Institutional arrangements include legislative frameworks, policy processes, decision rules, organizations conducting research and analysis, and so forth. This section describes the somewhat unique challenges fisheries management presents and the type of institutional arrangements and skills that are needed to operate effectively in this environment.

The rationale for government intervention in fisheries and the specific role played by fisheries management organizations is directly related to the common property nature of fisheries resources. That is, the absence of property rights for fish results in a market failure characterized by excess fishing capacity, stock depletion, and the loss of resource rents. The absence of property rights for fish before they are harvested is an important factor influencing the institutional arrangements used by governments to discharge their fisheries management responsibilities. In particular, the common property nature of fisheries resources means that dealing with access and allocation arrangements is a major preoccupation in many fisheries. In addition, there are other characteristics that affect the institutional requirements including the following:

- Uncertainty – Fisheries management is conducted in an environment of uncertainty since basic information such as fish stock abundance, productivity and the impact of fishing is often not understood with a high degree of confidence.

- Risk – Fishing involves taking risks related to the future sustainability of fisheries resources (target and incidentally-caught species). Fisheries management agencies operate on behalf of the public and decisions affecting the sustainability of fisheries resources should reflect societal choices. In addition to the uncertainty noted above, there is a wide range of public views on the appropriate degree of risk that is acceptable.

- Multiple Objectives – Fisheries management agencies often face multiple objectives some of which may be contradictory.

- Conflict among users – Since access and allocation arrangements continue to evolve and there is generally relatively little security of tenure, conflicts among resource users is common.

In describing institutional arrangements it is important to distinguish between what the arrangements are designed to accomplish and who actually carries out the activities. For example, it is argued below that having an understanding of the impact of fishing on fishery resources is a key feature of fisheries management. However, the research and analysis supporting this understanding can be carried out by government or non-government organizations. In fact, despite that fact that government scientists tend to dominate the field of stock assessment, there are compelling reasons to move towards alternative approaches involving fishery participants and other private sector businesses.

A brief overview of the key considerations associated with institutional arrangements is provided in Box 3.

In addition to the institutional arrangements described above, the appropriate capacity to carry out fisheries management functions is critical to success. In this context, institutional capacity includes people and funding. Specifically, it is necessary to have a critical number of skilled staff (or the services of "outside specialists") representing various disciples (e.g. lawyers, biologists, economists, enforcement specialists). The availability of a stable source of funds combined with cooperative working arrangements such as government-industry partnerships, is also critical.

Institutional arrangements will differ depending on whether the fishery being managed is exclusively domestic or has an international aspect. With respect to international fisheries matters, institutional arrangements centre on Regional Fisheries Management Organizations (RFMOs).

Box 3

Institutional arrangements – Key considerations

Organizations

- Fisheries management responsibilities are generally assigned in legislation to one or more government department or a statutory authority.
- Organizational units are commonly formed according to major functions (e.g. science, policy, resource management, enforcement, etc.)
- Collaboration among various organizational units, whether reporting to the same Minister, or not, is essential to achieve the level of integration required to manage fisheries effectively.

Processes and decision rules

- Given that fisheries management deals with the use of public resources, consultation with those directly involved in the fishery (e.g. harvesters, processors) and other interests (e.g. community and environmental groups) is essential.
- The participants and the method used to consult should be tailored to the subject matter. That is, the provision of scientific advice, policy development, determining access and allocation arrangement, establishing fishing plans, etc. may each warrant a different type of consultation.
- The institutional arrangements supporting both policy and operational functions need to be able to reconcile opposing views and lead to timely decisions rather than stalling in the absence of consensus.
- The use of decision-rules can be very effective in reducing the level of conflict and controversy associated with ongoing fisheries management decisions. For example, the basis for establishing annual harvest levels is less prone to resistance in fisheries where decision rules are in place.

Skills

- Effective fisheries management is a multidisciplinary operation requiring input from a variety of specialists including legal advisors, biologists, economists, enforcement officers, etc.
- The ability to communicate effectively, engage in meaningful consultations and resolve conflicts are particularly valuable skills.

Funding

- Fisheries management funding arrangements vary considerably from country to county or in many cases from fishery to fishery within the same country, including the amount of funding available, the source of funds, how it is allocated among different management functions, etc.

Since public funds allocated are rarely enough to meet all the demands placed on fisheries management organizations, it is important to identify alternative funding arrangements such as cost recovery, partnerships involving non-government organizations, co-management, etc.

Summary

- Institutional arrangements must bring together various disciplines (lawyers, biologists, economists, enforcement specialists, etc.)
- Fisheries management processes should involve stakeholders (harvesters, processors, community groups, environmentalists, etc.).
- Mechanisms should be in place to deal with conflicts in a timely and effective manner.
- While a government department or statutory authority usually delivers the fisheries management services, it is important to minimize bureaucracy and find innovative ways to get the job done, including identifying services the private sector can deliver.

2.4 Decision-making process

Effective fisheries management requires timely decisions on many issues, ranging from the establishment of key policy parameters to the approval of annual fisheries management plans. As described above, fisheries management decisions are often controversial and involve a high degree of uncertainty (e.g. lack of definitive information on stock size). In some instances the decisions involve trade-offs among several well-intentioned but contradictory objectives, thus making many important decisions subjective in nature. As a result, it is very important to clearly identify the issues that require decisions, the process that will be followed to reach decisions and how those affected will be informed once decisions have been made.

Issues requiring decisions can be grouped into two categories -- first, those that set the long term direction for fisheries management (e.g. the policy framework) and, secondly, the operational decisions that are made annually or in-season.

Long-term direction

Several major long-term fisheries management issues are highlighted below.

- **Biological management objectives** – It is helpful to establish the basis for setting annual (or multi-year) harvest levels as well as the approach that will be taken to rebuild a stock in the event that it has fallen to an unacceptably low level. For example, a fixed exploitation rate can be established to calculate the annual allowable harvest of a stock and the rebuilding schedule that will come into effect in the stock drops to a certain level (including target level and time frames to reach it).
- **Access and allocation arrangements** – Determining who is eligible to participate in a given fishery and controlling the amount of fish caught by individuals or groups of harvesters is a critical aspect of fisheries management. Much has been written on the “race for the fish” and the advantages of introducing stable fish allocations. Establishing long-term fish access and allocation arrangements tends to involve controversial but necessary decisions that ultimately affect the overall performance of a fisheries management regime.
- **Cost sharing** – It is common for governments to charge fees to those who participate in a fishery. In some cases the fees are directly linked to offsetting part of the cost of providing fisheries management services. Deciding the degree to which fisheries management costs are shared by government and participants in a fishery is becoming an increasingly important issue in many countries.
- **Public involvement in fisheries management** – Public involvement is fisheries management can take many forms ranging for providing advice on specific topics to co-management. It is important to decide what role the public should play and establish the appropriate institutional arrangements (e.g. advisory processes, partnership agreements, joint project agreements).

Operational decisions

- On an annual basis, there are many operational decisions that must be taken – e.g. setting the harvest level, determining fishing times and areas, etc.
- Ideally, many operational decisions are made by taking current information and applying it to a pre-established decision rule. A management decision rule involves specifying the management action that will be followed when specific criteria are met. For example, setting harvest levels using a biological management framework and making fish harvest allocations based on a long-term allocation policy.
- However, in the absence of long-term policies and decision rules, operational decisions can be very difficult – the annual process can be similar to making major policy decisions on the same issues year after year.

The decision-making process should be tailored to the type of decision being made and what is best suited to the specific situation. For example, the process used to decide on a major policy issue is likely to be very different from that used to make an operational decision. A key feature of the decision-making process is that of public participation. Given that fisheries resources are managed on behalf of the public and the absence of property rights, there is a large role for the public.

Following a decision, it is important to communicate to those affected both the decision and the basis for the decision.

Box 4

Principles to guide the decision-making process

Effective and efficient –The decision-making process should be designed to be cost effective and able to produce decisions that are supported by a solid rationale and, to the extent possible, supported by those affected by the decisions.

Transparent – Those affected by decisions, should ideally be involved in the decision-making process and where that does not happen, at a minimum understand the basis for decisions and process that was followed.

Timely – Decisions should be made on a timely basis to allow for proper planning.

Accountable - The process should clearly identify who is accountable for the decision and the role of all those involved (e.g. governments – national and regional, harvesters, environmental organizations, etc)

Information and analysis - Ensure that the best information and analysis available is used to support decisions. In most instances, information will be limited and decisions will be taken without perfect knowledge.

Public participation – Effective public involvement in planning and management is essential to ensure sound decision making and to build public understanding and support for necessary management actions.

2.5 Applied fisheries management activities

While the information presented above has focused on the structure and process of an effective fisheries management regime, we turn now to specific applied fisheries management activities – research, administration and management, and compliance and enforcement. A brief description of each activity follows.

2.5.1 Research

Research activities in support of fisheries management should focus on two fields – biological information (e.g. stock assessments, related ecosystem considerations, biodiversity, etc) and socio-economic information (e.g. income and employment).

Biological research – Sustainability of fisheries resources usually requires some knowledge of the abundance and productivity of fish stocks as the basis to determine that a certain level of removal is sustainable. To be most useful scientific advice should:

- provide the type of information that fisheries managers can use (i.e. supports decision-making) and that stakeholders can understand;
- be timely and in step with the management planning cycle; and
- be perceived to be unbiased and based on science conducted according to high scientific standards.

While many developed countries employ highly quantitative and data-demanding approaches to stock assessment, there are low cost ways in which stock status and trends in stock abundance may be evaluated. Specific examples are presented in Section 4 of this paper.

Socio-economic research – As noted above, economic and social objectives (e.g. generating foreign exchange earnings, income and employment) are important aspects of fisheries management. Thus, understanding the impact of alternative fisheries management arrangements on the economic and social objectives is essential. This is particularly important when considering changes to the fisheries management regime that affect the distribution of benefits – e.g. establishing a total allowable catch (TAC), changing the fishing season, regulating the minimum size of fish to be harvested, limiting the number of participants in a fishery, etc.

While generally more emphasis is placed on biological research in support of fisheries management, the extent to which socio-economic objectives are met is directly related to understanding the impact of alternative approaches.

> "Without an understanding of the social dimension of fisheries management, government is unlikely to structure policy to promote fisheries management in a way that is ecologically sound, socially acceptable and politically supported."[3]

2.5.2 Administration and management

Fisheries management plans set out the specific arrangement under which a fishery is conducted. The FAO Technical Guidelines on Fisheries Management (FAO, 1997) describe a management plan as:

> *" a formal or informal arrangement between a fisheries management authority and interested parties which identifies the partners in the fishery and their respective roles, details the agreed objectives for the fishery and specifies the management rules and regulations which apply to it and provides details about the fishery which are relevant to the task of the management authority."*

In the fisheries management plan, long-term objectives are translated into management actions. The specific actions that are taken to implement a management plan and the associated accountabilities vary from fishery-to-fishery. Depending on the fishery, the following actions may be taken:

- licensing individuals or companies to participant in the fishery;
- ensuring that only those eligible to participate in the fishery do so;
- ensuring that participants use authorized gear (mesh size, hook size);
- ensuring that fishing takes place in authorized areas and times;
- limit the catch to the total allowable catch (TAC) or in the case of individual quota fisheries, limit the catch consistent with individual entitlements; and,
- record of the details of the catch (both target catch and incidental catch).

2.5.3 Compliance and enforcement

The ultimate success or failure of a fisheries management regime depends on the level of compliance with the rules that are established and described in the management plan. The aim of a compliance strategy is to have people obey the rules that underpin the management system. For compliance to be effective, there must be a reasonable deterrence – a significant probability of being caught combined with a penalty that acts as an incentive to follow the rules. Activities such as monitoring, control and surveillance are designed to detect violations and therefore create a deterrent by enhancing the probability of being caught. Penalties, either established through the courts or through an administrative sanctions process, also create a deterrent.

Experience has also shown that people are more likely to accept and participate in a fisheries management regime when they see it as having legitimacy in terms of both process and outcome. This can achieved through stakeholder participation in various aspects of fisheries management, including the design of the compliance and enforcement programme. The rules of the management system and the services that support them should be operated in collaboration with the regulated community and other stakeholders.

3. BEST PRACTICES IN SELECTED JURISDICTIONS

While a great deal of attention is often focused on the failures of fisheries management (e.g. overfishing, the collapse of fish stocks, poor economic returns) there are many examples of effective fisheries management practices throughout the world. This section highlights examples of effective fisheries management regimes currently in place.

One useful approach to examining best practices is to focus on specific fisheries that are viewed as successful. For example, Hilborn *et al.*[4] identify the following fisheries as "Examples of Success" and go on to explore the relationship between success and the management regime.

- New Zealand lobster fishery

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[3] Harte, M., Fisher Participation in Rights-based Fisheries Management: The New Zealand Experience, in FAO Fisheries Technical Paper 404/1 Use of Property Rights in Fisheries Management (R. Shotton editor), 2000.

[4] Ray Hilborn, J.M. (Lobo) Orensanz and Ana M. Parma "Institutions, incentives and the future of fisheries", 2005, published in Philosophical Transactions of the Royal Society.

- Chilean artisanal fisheries
- Canadian sablefish fishery (Pacific coast)
- West Australian rock lobster fishery
- Australia Gulf of Carpentaria prawn fishery
- Tasmanian abalone fishery
- New Zealand Northeast Chatham Rise orange roughy fishery
- Canada and the US Pacific halibut fishery
- US hake and pollock cooperatives
- Geoduck clam fisheries Canada (British Columbia) and the USA (Puget Sound Washington State)

The authors conclude that a better fisheries management outcome is more likely with the right incentives, increasingly restrictive access, simpler institutions and appropriate management scales.

This section explores in greater detail the underlying fisheries management regime in two countries noted for their success in managing fisheries – Australia and Namibia.

3.1 Australia's Commonwealth Fisheries

3.1.1 Objectives and policy

In 1989, Australia's Commonwealth Government released a comprehensive policy statement, New Directions for Commonwealth Fisheries Management in the 1990s (New Directions). The policy statement contained explicit objectives relating to fisheries management expectations.

> "The three overriding objectives of the management controls outlined in this policy statement are:
>
> - to ensure the conservation of fisheries resources and the environment which sustains those resources;
> - to maximize economic efficiency in the exploitation of those resources; and,
> - to collect an appropriate charge from individual fishermen exploiting a community resource for private gain."

The New Directions policy was instrumental in reforming the overall approach to managing Commonwealth fisheries. Specifically, the following actions arose from the New Directions policy statement:

- A comprehensive policy framework was developed, including legislated fisheries management objectives for Australia's Commonwealth fisheries. Refer to the box below for details.
- New legislation was enacted, including the *Fisheries Management Act 1991* and the *Fisheries Administration Act 1991*.
- New institutions were established, in particular the creation of The Australian Fisheries Management Authority (AFMA) as a statutory authority, governed by an independent board, to manage Commonwealth fisheries.

The New Directions policy is an excellent example of clear objections and guidance being provided to the fisheries management authority and stakeholders. This degree of guidance in a policy statement was very helpful in designing the specific elements of the fisheries management regime throughout the 1990s.

In 2000, Australia's Commonwealth government initiated a review of the Commonwealth Fisheries Policy. Its aim was to recommend future arrangements for delivering Commonwealth fisheries policy into the new millennium. This review led to a number of important conclusions and strategies that reflect changing circumstances since the New Directions Policy was established and potential improvements.[5]

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[5] Refer to "Looking to the Future, A Review of Commonwealth Fisheries Policy", 2003 for details.

Box 5

Commonwealth Fisheries Management Objectives

The Fisheries Management Act 1991 states that the following objectives must be pursued by the Minister in the administration of this Act and by AFMA in the performance of its functions:

- implementing efficient and cost-effective fisheries management on behalf of the Commonwealth;
- ensuring that the exploitation of fisheries resources and the carrying on of any related activities are conducted in a manner consistent with the principles of ecologically sustainable development and the exercise of the precautionary principle, in particular the need to have regard to the impact of fishing activities on non-target species and the long term sustainability of the marine environment;
- maximising economic efficiency in the exploitation of fisheries resources;
- ensuring accountability to the fishing industry and to the Australian community in AFMA's management of fisheries resources; and,
- achieving government targets in relation to the recovery of the costs of AFMA.

3.1.2 Legislation and regulations

Australia's 1989 New Directions policy statement led to the development of various bills that provide the basis for current management of Commonwealth fisheries.

The Fisheries Administration Act 1991 - This Act established the Australian Fisheries Management Authority, the Fishing Industry Policy Council and Management Advisory Committees (MACs).

The Fisheries Management Act 1991 – This Act contains objectives for the Minister and AFMA as well as setting out key features of the fisheries management regime, including the development and provision of fishery management plans based on the principles of ecologically sustainable development; the establishment of statutory fishing rights, mechanisms for allocation of permits and licences; arrangements for management under joint authorities; and, surveillance and enforcement including specification of specific offences. The Act also establishes machinery for collection of levies imposed by other, related, legislation. For example, The *Fishing Levy Act* 1991 gives effect to cost recovery arrangements by imposing a levy on statutory fishing rights and permits.

Other legislation includes the *Fisheries Agreements (Payments) Act* 1991; *Fishing Legislation (Consequential Provisions) Act* 1991; *Fishing Levy Act* 1991; *Foreign Fishing Licences Act* 1991 and the *Statutory Fishing Charge Act* 1991.

More recently, the *Fisheries Legislation Amendment Act 1999* was enacted to give effect to the UN Fish Stocks Agreement on management of straddling and highly migratory fish stocks. This Act also provides the base for Australian action against illegal foreign fishing in Australian waters. This legislation gives Australia new tools to address illegal, unregulated and unreported (IUU) fishing both internationally and within the Australian EEZ.

3.1.3 Institutional arrangements and capacity

Commonwealth fisheries in Australia are administered by three bodies with separate responsibilities for management, policy and research and development. A brief description of the organizations responsible for each function follows.

> *Fisheries management* – The Australian Fisheries Management Authority was established in 1992 as a statutory authority, governed by an independent board, to manage Commonwealth fisheries. AFMA pursues a cooperative management approach to enable relevant stakeholders to take part in management processes alongside fisheries managers, but with management decision-making powers vested in the AFMA board.
>
> *Policy* – While AFMA is responsible for the day-to-day management of Commonwealth fisheries, policy functions are undertaken by the Fisheries and Aquaculture Branch of the Australian Government Department of Agriculture, Fisheries and Forestry. The Department's functions include responsibility for fisheries policy development; international negotiations to ensure the management of, and continued Australian industry access to, high seas resources; engagement in international and regional fisheries and aquaculture processes; and the development of competitive and sustainable fisheries industries.

> *Research* – The principal responsibility for investing in biological fisheries research and development lies with the Fisheries Research and Development Corporation (FRDC). The FRDC is a statutory authority funded jointly by the Australian Government and industry. Additional research in support of fisheries management is provided through a number of government research agencies such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Australian Bureau of Agricultural and Resource Economics (ABARE) and the Bureau of Rural Sciences (BRS).

Australia's capacity to manage commonwealth fisheries effectively is linked to both the people (highly-skilled individuals representing a variety of disciplines) involved in all aspects of fisheries management and the funding arrangements.

Commonwealth fisheries management activities are funded by a combination of government appropriations and cost recovery. Under government policy, the costs associated with many commercial sector management services are recovered from commercial fishers. Cost recovery levies are recovered on a fisheries-by-fisheries basis, which in turn necessitates that AFMA calculates management costs for each fishery on a detailed basis.

The federal government does not attempt to capture resource rent by charging commercial fishers access fees. The 2003 fisheries policy states:

> "… resource rents will not be sought for developed fisheries, as the Government recognizes the need to protect the interests of commercial operators, who have made significant financial investments in establishing fishing businesses based on an expectation of ongoing access rights to Commonwealth fisheries resources."
>
> ("Looking to the Future, A Review of Commonwealth Fisheries Policy", 2003 page 29)

The Government policy on cost recovery for fisheries management is consistent with the general philosophy that the beneficiaries of Government services should meet the cost of those services in accordance with the concept of user pays. Along with the move to implement cost recovery was a recognition that fishing operators were entitled to have a significant input to fisheries management decisions, including those which directly affect management costs.

Cost recovery in Australia has resulted in greater transparency and accountability concerning the cost and provision of management services due to the explicit identification and recovery of management costs.

3.1.4 Decision-making process

The main elements of the decision-making process for Commonwealth fisheries are outlined below. The description focuses on the decision-making role of the Australian Fisheries Management Authority, the Minister and management advisory committees.

Australian Fisheries Management Authority (AFMA) – The establishment of AFMA as a statutory authority resulted in the day-to-day decisions on fisheries management being made at arm's length from the Minister with portfolio responsibility for fisheries. The AFMA Board of Directors is responsible for overseeing AFMA's operations and making high-level decisions on fisheries management matters. The Board includes a Chairperson, Government Director, Managing Director, and 5 nominated Directors.

Ministerial involvement – While AFMA operates at arm's length from the Minister, the Fisheries Administration Act 1991 allows the Minister to give AFMA directions under exceptional circumstances and the Minister must approve AFMA's Corporate Plan, Annual Operating Plan and all statutory fisheries management plans.

Management advisory committees (MACs) – There is a strong emphasis on a cooperative partnership approach among key stakeholders, including fisheries managers, researchers, fishing operators, environment/conservation and recreational fishing interests (where appropriate) and other stakeholders, in the process of developing and implementing fisheries management arrangements. Central to this approach is the establishment and operation of Management Advisory Committees for each major Commonwealth fishery. Refer to the box below for more information on the role of MACs.

Box 6

Management Advisory Committees

Management Advisory Committees undertake a number of specific management-related activities for AFMA, including:

- being a liaison body between AFMA and persons engaged in a fishery;
- developing recommendations on the preferred management regime - such as whether a fishery should be managed under effort controls or individual transferable quotas;
- providing advice to AFMA in relation to the preparation and operation of management plans;
- annual evaluation of and advice on management expenditures for each fishery;
- monitoring, and reporting in relation to scientific, economic and other information relating to a fishery, including
- establishing a 5-year strategic research programme
- coordinating stock assessment activities
- developing bycatch recommendations; and
- providing advice on enforcement and compliance programmes.

3.1.5 Applied fisheries management activities

Research

Three features of Australia's approach to providing research in support of Commonwealth fisheries are noteworthy.

Scope of research – AFMA is required to ensure that the biological and economic state of each Commonwealth managed fishery is assessed on a continuing basis and that important gaps in knowledge are identified and overcome through research projects.

Cost recovery -– For most major fisheries, a system of 'cost-recovery' is in place where fishers pay, through their license fees, the full cost of research (as well as other services such as compliance, administration etc) in support of their fishery.

Stakeholder involvement – There is a formal process whereby stakeholders provide scientific and economic advice to help co-ordinate research. Priorities for research carried out under such 'cost-recovery' arrangements are set by joint Government/Industry management advisory committees. Research priorities are identified both as part of fisheries-specific management plans and also as more strategic, long-term Commonwealth priorities.

Administration and management

Australia has a well-developed system of fisheries management and all major Commonwealth fisheries are under formal management plans. Each management plan must state its management objectives, measures by which the objectives are to be attained, and performance criteria against which management measures may be assessed.

Management tools in use are fishery-specific, however, over the past 10 years, there has been a trend towards the use of output controls in commercial fisheries in preference to input controls. In particular, individual transferable quotas (ITQs) are being increasingly used as a management tool.

Ecosystem effects of fishing are increasingly being addressed as part of fisheries management planning. This process is being driven by national environmental legislation that requires management processes will ensure ecological sustainability of fisheries. As a result, issues such as ecosystem impacts of fishing activities, bycatch assessment and minimization and marine conservation (often through Marine Protected Areas) are an increasingly important component of fisheries management processes and policies.

Compliance and enforcement

AFMA has a responsibility to enforce the provisions of fisheries legislation through the detection and investigation of illegal activities by both domestic and foreign fishing boats in the Australian fishing zone (AFZ) and Commonwealth managed fisheries.

AFMA undertakes this function in conjunction with other relevant Commonwealth agencies, with specific compliance functions in the field being undertaken by officers from state fisheries and Northern Territory authorities on an agency basis. Through these arrangements, State agencies provide the manpower and expertise while AFMA provides overall coordination, policy direction and technical advice.

AFMA undertakes several compliance monitoring programmes to obtain information for use in routine surveillance, including vessel monitoring system (VMS) position reports, prior-to-landing reports, catch disposal records for product landed in port and fish receiver reports.

Australia's National Fisheries Compliance Strategy 2005–2010 was developed by the National Fisheries Compliance Committee. The Strategy outlines the strategic objectives that Australian fisheries agencies will pursue to promote voluntary compliance and create effective deterrence to illegal fishing activity. It also outlines the principles that agencies will use when planning cost-effective and efficient fisheries compliance programmes.

> "To achieve optimal levels of compliance with fisheries laws by maximising voluntary compliance and creating an effective deterrent against illegal activity.
>
> Strategic objectives critical to achieving this mission include:
>
> - Maintaining productive working relationships with stakeholders and developing a partnership approach to fisheries management where possible;
> - Pursuing cooperation with fisheries stakeholders to develop and implement fisheries policies and laws that identify potential risks and strategies to lessen them;
> - Pursuing cooperation across jurisdictions to form effective alliances between related agencies;
> - Integrating compliance strategies into fishery management arrangements at the initial planning stage;
> - Monitoring and acting quickly to combat opportunistic as well as organized criminal involvement in fisheries;
> - Ensuring that fisheries laws are administered and enforced fairly, reasonably and cost effectively for both fishers and compliance agencies, and
> - Maintaining the effectiveness and integrity of compliance staff through advanced training, processes and accountable decision making."

3.2 Namibia

3.2.1 Objectives and policy

Following independence in 1990, Namibia took decisive action to address problems in its fisheries, including the depletion of fish stocks. The role of fisheries policy and objectives in guiding the development of the fisheries sector is noteworthy.

In 1991, the policy framework for Namibia's marine fisheries sector was set out in a White Paper title "Towards Responsible Development of the Fisheries Sector". The White Paper established the following goal of fisheries management and development:

> "To utilize the country's fisheries resources on a sustainable basis and to develop industries based on them in a way that ensures their lasting contribution to the economy and overall development objectives."

This goal was to be pursued through the following main strategies:

- rebuilding fish stocks through the implementation of sound research as a basis to formulating optimal utilization strategies;
- building a national fishing and fish processing industry;
- Namibianization to counter pre-independence foreign domination of the sector through taxes and levies whereby increased Namibian participation is rewarded; and,
- empowerment of previously disadvantaged Namibians by preferential granting of fishing rights.

Once the policy environment had been established, it provided the basis for the legislative framework that was put in place – the 1992 Sea Fisheries Act. Details of the new fisheries management system, based on long-term access rights and vessel quotas, were further elaborated in the 1993 "Policy Statement on the Granting of Rights of Exploitation to Utilize Marine Resources and on the Allocation of Fishing Quotas". This policy statement focused on the following key issues – maintaining stock recovery, compliance control, industrial development, Namibianisation, advancement of socially or educationally disadvantaged persons, and improving the services of the Ministry of Fisheries and Marine Resources.

The role of policy and objectives in Namibia is similar to the Australian example described above in that the policy framework represented a clear statement of the government's intent in managing the fisheries and the policy statement was used as the basis for drafting legislation and designing institutional arrangements.

> "*Namibia's policy and legal framework for the marine fisheries sector has allowed the application of management strategies that are appropriate to Namibia's specific circumstances. The result has been the development of a business environment that has facilitated the growth of a healthy fishing and processing industry that pays a fair price for the privilege of utilizing Namibia's marine resources.*"[6]

3.2.2 Legislation and regulations

Following independence, one of the first acts of Parliament was the Territorial Sea and Exclusive Economic Zone of Namibia Act of 1990, highlighting the importance placed on the fisheries sector. In 1992, Parliament passed the Sea Fisheries Act based on the 1991 fisheries policy paper. During the 1990s, Namibia signed on to a number of international fisheries conventions and agreements, including:

- The 1995 UN Fish Stocks Agreement;
- The 1993 FAO Compliance Agreement; and,
- The 1995 FAO Code of Conduct for Responsible Fisheries.

These new international obligations led to a revision of the 1992 Sea Fisheries Act which was replaced in by the Marine Resources Act in 2001. The new Act incorporates international best practices for fisheries management and incorporates the key elements of the international fisheries management instruments mentioned above. For any fisheries or international agreements entered into by Namibia, the Minister is empowered to make regulations necessary to give effect to such agreements. Texts of all conservation and management measures adopted under any international agreement to which Namibia is a party are published in the national Gazette, and thus such measures are then deemed to be a regulation as prescribed under the Act. Various regulations have been promulgated under the Act which establish the terms and conditions for all vessels and fishers operating within Namibia's EEZ.[7]

3.2.3 Institutional arrangements and capacity

Namibia's key fisheries institution is the Ministry of Fisheries and Marine Resources (MFMR). Established in 1991, it had from its inception a very clear fisheries management focus. Until 1998 the Ministry consisted of two Directorates: the Directorate of Resource Management, responsible for scientific research and advice; and the Directorate of Operations, responsible for monitoring, control and surveillance, and also initially responsible for administration and a range of other functions including economics.

A third Directorate, the Directorate of Policy Planning and Economics, was established in 1998 to strengthen the policy and planning functions of the Ministry. Specific objectives of the Directorate of Policy Planning and Economics are to ensure that fisheries activity contributes Namibia's socio-economic development goals; create a conducive environment in which the fisheries sector can grow to its full potential; ensure that Namibia is properly represented internationally and that national fishery interests are protected; administer fisheries legislation and regulations; administer the collection of fees and levies generated by fishing activity; and, manage the collection and preparation of information and fishery statistics.

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[6] Paul Nichols, Marine Fisheries Management In Namibia: Has It Worked? In Namibia's Fisheries: Ecological, economic and social aspects pp 330-31.

[7] FAO Country Profile

In addition to the three Directorates, a specialized division coordinates fisheries cooperation with states within the Southern African development Community (SADC) and a General Services Division is responsible for matters relating to finance, personnel, transport and other auxiliary services.

The Ministry of Fisheries and Marine Resources places very high emphasis on the development of human resources, including the fishermen, vessel skippers, research scientists, observers, inspectors and managers.

Apart from normal company and personal income tax, there are three main components to Namibia's funding arrangements for the fisheries sectors – rent recovery, cost recovery and donor funding. Each is described briefly below.

> *Rent recovery*[8] – Namibia's fee structure is based, in part, on the principle that the broader society has a right to benefit from the productivity of the natural capital that belongs to the country and that management of fishing activities is part of the cost of fishing.
>
> *Cost recovery* – Two levies are charged to offset specific fisheries management costs -- the Marine Resources Fund levies which funds fisheries research and the Fisheries Observer Fund levies which is applied to the cost of providing 100 percent observer coverage.
>
> *Donor funding* – In addition to the budget provided by the Government of Namibia, the Ministry receives technical and financial assistance for various countries and organizations. The main donor support received in 2003 is presented in the table below.

Table: Donors and assistance provided

Donor	Type of assistance provided
Norwegian Agency for Development Cooperation (NORAD)	Marine fisheries research, technical staff, staff training, monitoring, control and surveillance, Namibia Maritime and Fisheries Institute (NAMFI).
Iceland International Development Agency (ICEIDA)	Technical assistance and human resources development to the Minister and NAMFI.
Food and Agriculture Organization of the United Nations (FAO)	Technical assistance in the development of aquaculture legislation.
Germany – GTZ (Gesellschaft fur Technische Zusammenarbeit)	Capacity building through staff training; procurement of equipment.
Department for International Development (DFID)	Technical assistance for improvement of Fisheries Information Management System (FIMS) has been completed.
European Union (EU)	Financial support for Traditional Fishing Development project, technical assistance for Omahenene/Onavivi Island Aquaculture Centre, Omusati region, NAMFI and Vision 2030.
Government of Malawi	Technical assistance (aquaculture development projects).
World Life Fund	Shared resources management on the Zambezi/Chobe Systems.
Government of Cuba	Technical assistance (aquaculture development projects).

Government revenue is collected through the following fees and levies.

> ***Quota fees*** – Quota fees are charged to the holders of rights to exploit certain commercial fisheries. Once right holders have accepted their quota allocation, they become liable for the payment of a quota fee, whether the fish is caught or not. Quota fees give incentives to use Namibian labour, both on vessels and by landing the fish for onshore processing. Also, the use of Namibian-owned vessels is encouraged through preferential rates. Quota fees form a significant revenue component for the government.
>
> ***Bycatch fees*** – Namibian vessels are required to bring all catches to shore. To prevent them from targeting species that they do not have a licence for, a by-catch fee is charged. By-catch fees are set at rates designed to deter right holders from targeting species for which they do not have a quota, but to still make it profitable to land truly incidental by-catch. By-catch fees avoid the complications associated

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[8] Resource rents are the profits earned on a natural resource in excess of what would be considered a normal return.

with setting quotas for more than one species in a fishery. The ban on discarding also makes it easier to monitor all catches taken by quota holders.

Licence fees – Fishing companies pay a nominal licensing fee for vessels. Fishing vessels must have a license issued by MFMR to be able to catch fish in Namibian waters. Each year between 300 and 350 vessels are licensed by MFMR. In addition, under the Marine Resources Act, Namibian flagged vessels may not harvest fish outside the Namibian EEZ unless they have a license from MFMR. This is to ensure that Namibian fishing vessels do not participate in any illegal, unreported and unregulated (IUU) fishing activities.

Marine Resources Fund levies - The Marine Resources Fund (MRF) finances the research activities of the Ministry as well as a number of training initiatives. A small fee is charged on all landings and that fee goes to this fund. While the Ministry controls the expenditures of the MRF, the quota and bycatch fees go directly to the public coffers and are not under the control of MFMR.

Fisheries Observer Fund levies – Fishing rights holders must pay an Observer Fund levy which is used to fund the Fisheries Observer Agency which was established to run the fisheries observer function.

Namibia has been very successful in both the generation of rent and in collecting sufficient revenue to cover management costs. Accordingly, the fishery in Namibia provides a net contribution to the national purse. Few other fisheries management authorities have achieved this.

3.2.4 Applied fisheries management activities

Research

Fisheries research focuses on the collection and analysis of oceanographic data and information derived from systematic surveys conducted by the Ministry research staff. Catch and effort data from the fishing industry are used in the assessment of stocks. This is done in an effort to better understand the impact of environmental fluctuations on fish stocks. Industry socio-economic information together with stock biomass estimates are used in determining the TAC to be allocated to the fishing industry.9

Biological research is carried out by the Directorate Of Resource Management which has the following objectives – to provide scientific advice to enable total allowable catches (TACs) to be determined; to provide advice so that policy on harvesting activity and techniques can be formulated; and, to provide advice on the inter-relationship of the environment and the impact this has on fish stocks.

The Directorate has two research centres:

- The National Marine Information and Research Centre, which undertakes applied fisheries and environmental research, physical, biological and chemical oceanography, stock surveys and stock assessment research. The principle role of the research centre is the provision of advice to MFMR on TACs for commercial stocks and other management measures. It also houses and coordinates regional research programmes and applied research into aquaculture and inland fisheries.

- Hardap Freshwater Research Institute, focuses on freshwater fish and invertebrate research, migrations of freshwater fishes using radio tagging methods, and the development of freshwater aquaculture techniques and assessment of candidate species.

Administration and management

The Directorate of Operations regulates the fisheries sector activity within the EEZ. This involves the following objectives of the Directorate - restrict fishing activity to those entitled to do so; ensure that fishing activity is conducted within the legal and administrative guidelines; ensure that revenue from landings are correctly calculated; and, ensure that landings of species caught outside Namibia's EZZ - are done in accordance with provisions of international fisheries organizations of which Namibia is a member.

The Namibian management regime for marine capture fisheries consists of a number of components that each plays a part in contributing to the fisheries management goals. Key features include: limited access

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[9] Republic of Namibia, Ministry of Fisheries and Marine Resources, Annual Report 2003.

through the setting fishing rights, establishing TACs for all major commercial species, allocation of individual quotas, and a system of fees. Key elements of the system are outlined below.

Fishing rights are granted for a period of 7, 10, 15 or 20 years depending on various factors, in particular the level of investment and the level of Namibian ownership. The term of fishing rights has recently been expanded from 4, 7 and 10 years, mainly to promote stability of the sector. Fishing rights are not freely transferable in Namibia. The main reason is the possibility that transfers of rights might seriously threaten the progress made in the goals of Namibianisation and empowerment.

Compliance and Enforcement

An integrated programme of inspection and patrols at sea, on land, and in the air ensures continuing compliance with Namibia's fisheries laws. The major features of the programme are described below:

- Virtually complete coverage of larger vessels by onboard observers serves both to ensure compliance and collection of scientific data.
- Systematic sea patrols, largely directed at ensuring compliance with fishing conditions by licensed vessels through regular at-sea inspections. Air patrols detect and deter unlicensed fishing vessels and monitor the movement and operations of the licensed fleet. Shore patrols ensure compliance by both recreational and commercial fishers with conservation measures for inshore resources.
- Complete monitoring of all landings at the two commercial fishing ports, Walvis Bay and Luderitz, by onshore inspectors ensure compliance with quota limits and fee payments.
- All vessels are required to supply EEZ exit and entry reports as well as daily catch and effort reports in the form of vessel log-sheets.

- Namibia is well advanced in implementing a national satellite-based vessel monitoring system (VMS). Once fully operational the system will benefit fisheries management in real-time monitoring of vessel movement and activities. The system that has been chosen is already in use in the United Kingdom, Germany, United States, Morocco, and, closer to home, South Africa and Mozambique. Namibia is fully supportive of collaborating in the development of a cost-effective, regional VMS.

4. SELECTED PRACTICES IN OTHER JURISDICTIONS

4.1 Policy and objectives: the Philippines

The fisheries objectives and policies are contained in the Philippine Fisheries Code of 1998. Key elements of the policy framework are as follows:

- To achieve food security as the overriding consideration in the utilization, management, development, conservation and protection of fishery resources in order to provide the food needs of the population.
- To limit access to the fishery and aquatic resources of the Philippines for the exclusive use and enjoyment of Filipino citizens;
- To ensure the rational and sustainable development, management and conservation of the fishery and aquatic resources in Philippine waters including the EEZ) and in the adjacent high seas, consistent with the primordial objective of maintaining a sound ecological balance, protecting and enhancing the quality of the environment;
- To protect the rights of fisherfolk, especially of the local communities with priority to municipal fisherfolk, in the preferential use of the municipal waters. Such preferential use, shall be based on, but not limited to, maximum sustainable yield (MSY) or total allowable catch (TAC) on the basis of resources and ecological conditions, and shall be consistent with our commitments under international treaties and agreements;
- To provide support to the fishery sector, primarily to the municipal fisherfolk, including women and youth sectors, through appropriate technology and research, adequate financial, production, construction of post-harvest facilities, marketing assistance, and other services.

- To manage fishery and aquatic resources, in a manner consistent with the concept of an integrated coastal area management in specific natural fishery management areas, appropriately supported by research, technical services and guidance provided by the State, and
- To grant the private sector the privilege to utilize fishery resources under the basic concept that the grantee, licensee or permittee thereof shall not only be a privileged beneficiary of the State but also an active participant and partner of the government in the sustainable development, management, conservation and protection of the fishery and aquatic resources of the country.

An important feature of the policy direction for the fisheries sector in the Philippines is the move to community management. The policy framework is part of a larger governmental mandate to lead in the sustainable management through co-management, which involves participation of key stakeholders.

4.2 Legislation and regulations: Mauritius

The basic legal instrument for the management of fisheries in the waters of Mauritius is the Fisheries and Marine Resources Act of 1998 (FMRA). The purpose of this Act is to provide for the management, conservation, protection of fisheries and marine resources, and protection of the marine ecosystem in the waters of Mauritius.

The FMRA is divided into ten parts. The most important parts concerning fisheries management are as follows:

Part II (Management of fisheries and marine resources)

- lays down the basic management functions relating to both coastal and offshore fisheries including registration of fishers, collection of basic data on fisheries (catch, effort, area of fishing, species of fish caught, fishing boats) and other biological information.

Part IV (Control of fishing activities)

- provides for prohibited fishing methods e.g. with poisonous substances, spears or explosives and artificial light, closed periods, prohibition of underwater fishing and for fishing undersized fish, turtles, mammals, sale of toxic fish and fish products unfit for human consumption, and obligations on fishers to land their catch only at prescribed fish landing stations.
- makes provisions for licenses issued to local and foreign fishing boats (defined as not exceeding 20 m in length) and vessels (exceeding 20 m in length). This sub-part also provides for the Government of Mauritius to enter into agreement with other countries, intergovernmental organizations or fishing associations to allow their vessels to fish in Mauritian waters.

Part VII (Obligations relating to boats and vessels)

- Owners of fishing boats and vessels should have them registered with the Fisheries service. Fishing boats should properly display identification marks. Landings of fish catches should be done in Mauritius unless otherwise authorized.

Part X (Miscellaneous)

- The Minister is empowered to make regulations generally for the implementation of the Act.

Among the non-fisheries legislations that impact on fisheries management are:

- The Merchant Shipping Act 1986
- The Ports Act (1998)
- Immigration Act
- The Custom Tariff Act
- Investment laws such as the Investment Promotion Act
- The Food Act (1998)
- The Environment Protection Act (2002)
- The Maritime Zones Act (1977) and the Maritime Zones (EEZ) Regulations 1984

- The National Coast Guard Act (1988).

4.3 Institutional arrangements and capacity: Iceland

Appropriate institutional arrangements and capacity are needed to develop and effectively implement fisheries management regimes.

The Ministry of Fisheries is responsible for the management of fisheries in Iceland, including research on fish stocks, the conservation and utilization of these stocks together with other living marine and sea bed resources, as well as managing the areas where they are utilisable. The work of this Ministry is intended in particular to ensure and maintain long-term ocean health and maximum yields for the Icelandic nation from sustainable utilization of the living marine resources.

The Ministry of Fisheries is supported by the Directorate of Fisheries, the Marine Research Institute and the Icelandic Fisheries Laboratory. A brief description follows.

Directorate of Fisheries – The Directorate of Fisheries is responsible for a variety of matters concerning fisheries management, supervision of production of marine products and supervision of imports and exports of fish and fish products. The Directorate of Fisheries oversees implementation of the Fisheries Management Act and related Acts concerning, for instance, the issuing of licenses for fishing and fish processing, allocation of quotas and data collection. The Directorate of Fisheries is also responsible for ensuring compliance with laws and regulations, and imposes penalties for violations. In addition to enforcing the laws on fisheries management, the Directorate of Fisheries ensures compliance with Acts and Regulations on the handling, processing and distribution of marine products, and is responsible for collecting and disseminating information on fishing and processing of catches.

Marine Research Institute (MRI) – The Marine Research Institute (MRI), established in 1965, is a government institute under the auspices of the Ministry of Fisheries. The MRI has three main roles: to carry out research on the ocean and marine life; to advise the government on sustainable utilization of marine resources; and to provide information to the authorities, interested parties in fisheries and the general public. In addition to its own research programmes, the Institute works in collaboration with international organizations such as ICES. This includes the TAC setting process in which ICES reviews results and makes joint recommendations on TAC levels.

Icelandic Fisheries Laboratory (IFL) – The IFL is entrusted with carrying out research, providing advice and disseminating information in matters concerning the processing and consumption of marine products. The IFL aims to increase the value, quality and safety of marine catches with research into development and dissemination of knowledge. Their areas of research are mainly the processing and aquaculture sector. The IFL also runs training courses for industry and Universities.

The Fisheries Association of Iceland represents the fishery sector’s interests domestically and internationally. The areas of discussion include environmental issues and responsible resource utilization.

4.4 Decision-making processes

4.4.1 United States of America – Regional Fishery Management Councils

The Magnuson-Stevens Fishery Conservation and Management Act is the primary US law dealing with domestic marine fisheries resources and fishing activity within federal waters.[10] Under the Act, the lead federal agency responsible for fisheries management is identified as the National Marine Fisheries Service (NMFS) which is part of the National Oceanic and Atmospheric Administration (NOAA) within the Department of Commerce.

To balance national and regional concerns in the development of conservation and management measures, the Act created eight Regional Fishery Management Councils (Councils). Under the Act, these eight Regional Fishery Management Councils are charged with preparing Fishery Management Plans (FMPs), using the best scientific information available, for the fisheries within their areas of authority. A brief overview of the decision-making process follows.

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[10] Those waters extending seaward from the edge of the coastal state waters (usually out to three miles off their coats) to the 200-mile limit.

The eight Councils develop Federal fishing plans and regulations through a process involving technical teams, independent scientific committees, constituent advisory panels, enforcement officials, lawyers, management agencies, and the public. Council members are nominated by state governors in each region and appointed by the Secretary of Commerce. On each council are each state's director of marine fisheries; a person knowledgeable of fisheries or marine conservation from each state; and some at-large members from any of the states in the region. Councils have Scientific and Statistical Committees (of scientists and other technical persons) and Advisory Panels (of people knowledgeable in fisheries or conservation). The plans and their concomitant regulations are submitted to NMFS for approval and implementation.

NMFS coordinates and approves fishery management plans, implements and enforces regulations, and conducts other fisheries conservation and service programmes. All Council-prepared FMPs must be reviewed for approval by the Secretary of Commerce and then implemented by NMFS through Federal regulations. The FMPs are amended by the Councils and the amendments are submitted for approval under the same Secretarial review process as new FMPs. Most of the FMPs have been amended since initial implementation.

One of the keys to successful fishery management is incorporating diverse views into decision making through a transparent public process. The Council system was designed so that fisheries management decisions were made at the regional level to allow input from affected stakeholders. Council meetings are open, and public testimony – both written and oral – is taken on each and every issue prior to deliberations and final decisions. Public comments are also taken at all Advisory Panel and Scientific and Statistical Committee meetings.

Each Council decision is made by recorded vote in public forum after public comment. Final decisions then go to NMFS for a second review, public comment, and final approval. Decisions must conform with the Magnuson-Stevens Act, the National Environmental Policy Act, Endangered Species Act, Marine Mammal Protection Act, and other applicable law including several executive orders. Regulatory changes may take up to a year or longer to implement, particularly if complex or contentious.

Management of US fishery resources is an extremely complex process, requiring the integration of basic and applied research, outputs of sophisticated stock assessment models, socioeconomic factors, and allocations among user groups to maximize the benefits of the resource to the Nation. At the very foundation of that process, however, are fishery resource data that lead to credible, high-quality information that minimizes risk in management decision-making.[11]

4.4.2 Decision rules in New Zealand and Canada

Management of the New Zealand rock lobster fishery involves a mixture of stock assessments, decision rules and management procedures. Formal stock assessments are conducted annually, however, given the time and complexity of these activities only one or two areas are assessed each year and thus each area is assessed only once every three or four years. As a result, greater reliance has been placed on decision rules and management procedures.

Decision rules and management procedures used in the New Zealand rock lobster fishery specify how fishery management changes will be made in response to fishery data. The decision rules specify what data will be examined, what will "trigger" the rule, and what management actions will result.

- For the northern and central substocks, a simple decision rule is used that mandates a stock assessment when catch per unit effort (CPUE) falls below a specified base level.
- A more sophisticated approach is followed to ensure that the stock will rebuild to a target biomass level in a reasonable period.

The management of Canada's Pacific Herring Fishery also utilizes decision rules for many fisheries management decisions, thus facilitating the development of annual fishing plans. For example, the determination of annual harvest levels, the allocation of herring among various user groups and the timing of specific fisheries are all governed by decision rules.

A brief description of the rules used to determine the annual harvest level follows.

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[11] FAO Country Profile

- Harvest rate – Harvest limits are established to ensure that sufficient biomass is available to replenish the stocks on an ongoing basis. A harvest rate of 20 per cent for Pacific herring was introduced in 1983 and is applied to each of the five herring stock areas. The 20 percent harvest rate is based on an analysis of stock dynamics, which indicates this level will stabilize both catch and spawning biomass while foregoing minimum yield over the long term.
- Cut-off level – If the stock is in a given area is substantially below a predetermined "cut-off level" then commercial fishing is curtailed. Cut-off levels were introduced in 1986 and have been revised from time to time but have generally remained fixed since 1996.
- Reduced catch level – For those stocks which are marginally above cut off the following reduced catch level is recommended: catch = forecast run – cut off. This provides for smaller fisheries in areas where the 20 percent harvest rate would bring the escapement down to levels below the cut off.

4.5 Applied fisheries management activities

This section provides examples of best practices in the delivery of applied fisheries management activities organized according to three categories – research, administration and management, and compliance and enforcement.

4.5.1 Research

In effective fisheries management regimes, decision-makers are informed by research on both the biological management considerations (e.g. stock assessment) and the socio-economic considerations. Generally, the major focus is on the biological management considerations and in industrial fisheries the costs of research can be significant. For example, an OECD report showed that member countries dedicated on average 34 per cent of their total fisheries management expenditures to research. The types of research expenditures include data collection, at-sea surveys, data analysis and stock assessment.

Even developed countries can not afford to do a high level of assessment on all stocks – the high value stocks tend to get the most funding. While the approach to providing research to decision-makers is often expensive in developed countries, there are examples of low cost approaches. One such approach is described in Box 7.

Box 7

Participatory Fisheries Stock Assessment (ParFish)[12]

ParFish is a recently-developed approach to fisheries stock assessment and adaptive management that involves fishers in the management process. It combines quantitative techniques with resource users knowledge to generate control measures for a fishery. ParFish differs from traditional stock assessments:

- It can provide management recommendations rapidly for fisheries with no existing data, in contrast to other stock assessment methods which require long time-series data to model the fishery.
- A preliminary assessment can be carried out quickly and cost-effectively to provide a starting point for adaptive management.
- Input from fishers an other stakeholders is a critical aspect of the approach.

The ParFish process was tested in Zanzibar with three fishing communities in Kizimkazi.

- Information was collected through fisher interviews and fishing experiments.
- The output of the software suggested that fishing effort should be reduced by 10–20 percent to reduce the probability of over-fishing and provide catch rates preferred by fishers.
- The results were presented to fishers and provided the basis for a multi-stakeholder workshop to discuss fisheries management options.

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[12] ParFish was developed with support from the UK Department for Development through its Fisheries Management Science programme.

4.5.2 Administration and Management

One approach to improving the cost effectiveness of fisheries administration and management activities is to identify services that the private sector is well-suited to deliver. One such example, that of New Zealand, is described in Box 8.

Box 8

Devolution of Fisheries Services: A New Zealand Example

Various functions associated with the operation of the quota management system have been devolved or contracted to the New Zealand Seafood Industry Council Ltd (SeaFIC). Commercial Fisheries Services, a wholly owned subsidiary of SeaFIC, delivers these services. It operates under the brand name 'FishServe'. Functions, duties and powers devolved to FishServe include:

- Registering clients and vessels.
- Licensing fish receivers.
- Issuing catch return books and operating returns management processes including electronic data transfer for statutory reporting.
- Processing quota and annual catch entitlement transactions, including mortgages and caveats.
- Catch balancing.

In addition devolved services, FishServe provides services under contract to the Ministry of Fisheries:

- Delivery of catch effort services, including issuing return books and the returns management process.
- Issuing fishing permits.
- Registering foreign owned vessels, charter vessels, and fish carriers.
- Monitoring catch limits.
- Delivery of revenue services, including invoicing, receiving and debt management of cost recovery and deemed values.

The annual cost of the above services to the industry has decreased annually from NZ$8.65 million in 2000/01 to NZ$5.76 million in 2003/04. During this period, the volume of data transferred electronically has increased. Devolution has allowed FishServe to be a lot more innovative and less bureaucratic. The industry has been prepared to invest in FishServe given that they own it, and consequently FishServe has been able to invest .in new technology that brought about major efficiencies.

4.5.3 Compliance and enforcement

A key issue in the operation of many fisheries compliance systems is their enforceability and the effectiveness of the judicial proceedings. Judicial processes are often criticized as being unduly lengthy, and strict insistence on high standards of proof can lead to too few successful prosecutions to curb illegal fishing.

Box 9

Restorative Justice: A Canadian Example

On Canada's Pacific coast, the federal government and an Aboriginal band (Seabird Island First Nation) have entered into a protocol that enables band members charged with offences to have their cases diverted from the traditional legal system to an out-of-court local justice committee for alternative community-based enforcement.

This approach is a form of restorative justice that approaches crime as an injury or wrong done to another person or community, rather than solely as a crime of interest only to the accused and the state.

Having fisheries offences diverted to a restorative justice process under the Protocol is consensual. If the accused, the community, the fisheries management agency or the Crown (after charges have been laid) do not consent, the matter remains in the traditional court system. Likewise, if the accused does not agree to the disposition reached through the traditional circle, the matter is referred back to the Crown.

Here an accused in a criminal trial has the right to remain silent, a person who agrees to the restorative justice process must engage in dialogue with his community, the fishery officer and others. At the end of the process, rather than having to pay a fine or being sent to jail, the person will usually be asked to undertake some positive activity, such as teaching youth about the harm done by poaching, doing community service work for elders or perhaps catching fish for those in need.

Several countries have addressed this situation by introducing a system of administrative penalties for dealing with fisheries offences, which enables the tribunal to apply a lower standard of proof than is possible in a full criminal trial (proof on the civil standard of balance of possibilities rather than on the criminal standard of beyond a reasonable doubt). This system facilitates expedited hearings, and can include the possibility of a negotiated settlement. Despite the fact that administrative penalties involve a possible diminution of their legal rights, it is often popular with fishers because it enables a speedy resolution of their cases.

5. POTENTIAL TO USE BEST PRACTICES MORE BROADLY

The best practices described above are intended to illustrate approaches that have been used successfully in some countries and may be applicable elsewhere. Generally, the practices described are the basic "building blocks" of a sustainable fisheries management regime and can be pursued over time in any country. However, a variety of factors will influence a country's ability to adopt a given practice and the time frame associated with implementing these practices.

The challenges are greatest in countries that dedicate very limited effort to actively managing fisheries and have no adequate institutional arrangements to resolve differences among fisheries stakeholders. In these situations, the move to adopting best practices should be made over an extended time period and involve a series of sequential steps. In effect, the issue is how a country can establish an effective fisheries management regime where little management capacity exists. A brief overview of the steps that may be followed in these countries follows.

5.1 Step 1 – Seek political support to develop a fisheries sector strategy

- A highly skilled individual should be identified to play a lead role in developing a fisheries sector strategy for the country. Ideally, this individual would be a senior government official with a good understanding of overall government priorities, the fisheries sector and fisheries stakeholder perspectives.
- If necessary, a technical expert from outside the county should be identified to work with the senior government official. The technical expert must have experience in fisheries management and international assistance (e.g. organizations and programmes that may support the fisheries sector). In Namibia, non-national advisors have played a key role in the design and implementation of the fisheries management regime.
- A proposal to develop a national fisheries sector strategy should be developed by the individual(s) identified above with input from political leaders, government officials and stakeholders. The purpose of the proposal would be to seek political support for the development of a national fisheries sector strategy and the main elements of the strategy. The proposal should identify key problems and opportunities associated with the fishery and should be submitted to the Minister responsible for fisheries.
- To be effective, the proposal should clearly articulate the following:
  - current state of the fishery, including trends in fish stock abundance for the most important species, number of people dependant on the fishery and the economic benefits generated;
  - the outlook under the current fisheries management regime, including most serious problems that should be addressed (e.g. if no changes are made fish stocks are expected to decline);
  - opportunities to improve the performance of the fishery and thereby achieve a more stable flow of benefits from the fishery – food, employment, income, etc.;
  - options to address the problems and take advantage of opportunities. The options should be supported by a review of the main impacts anticipated if that option was pursued;
  - a recommendation to develop a national fisheries strategy and the main elements of the proposed strategy.
- If there is political support to proceed, then work should begin on the development of a fisheries sector strategy.

5.2 Step 2 – Draft Fisheries Sector Strategy

- A small team should be formed to draft the fisheries sector strategy. The team should consist of the senior government official and the external technical expert (if one is being utilized) and other skilled individuals, including those affiliated with international organizations (e.g. FAO, World Bank, WWF, etc.
- The strategy for the fisheries sector should include objectives, priorities and desired outcomes and be developed in conjunction with stakeholders.
- Prepare for consultations with stakeholders by designing a consultative process and presentation materials.
- Launch a consultative process to establish a common vision of what a sustainable and efficient fisheries regime is and how it can be achieved. It is critical that all the major stakeholder groups are represented and leaders within the stakeholder community play prominent roles in this consultative process.
- Begin consultations by describing the current state of the fishery and the outlook under the existing fisheries management approach. This will form the basis of a joint definition of the problems that should be addressed.
- Provide some guiding principles to help focus the discussion, including broad government priorities related to national or regional economic development as well as government priorities for the fisheries sector.
- Seek agreement on the main objectives that should be pursued in managing fisheries.
- Draft a comprehensive strategy, incorporating where appropriate components developed during consultations.
- The strategy should include the main building blocks that underpin successful fisheries management regimes – a clear articulation of objectives and policy, a plan to develop legislation and regulations where required, a plan to establish appropriate institutional arrangements and capacity, as well as design an effective decision-making processes.
- Seek political support for the draft strategy and modify as necessary.
- Provide an explanation when recommendations coming out of Stage 2 could not be incorporated into the strategy.
- Present the strategy to stakeholders and modify as necessary.

5.3 Step 3 – Move towards implementation of best practices

- The strategy will serve as an overall guide for the fisheries sector.
- Engage funding partners and fisheries stakeholders in the development of an implementation plan.
- Formalize the fisheries management strategy and implementation plan by:
    - articulating the policy, objectives, legislation and regulations;
    - establishing the appropriate institutional arrangements and ensure there is sufficient capacity (skilled individuals and funding) to meet the requirements defined; and,
    - engaging stakeholders in the decision-making process.

The approach outlined above is generic and must be tailored to the specific circumstances in a given country. However, the fundamental approach remains the same – develop a clear plan and utilize scarce resources to support implementation of the plan. In this way funding decisions are linked to objectives, priorities and desired outcomes.

Box 10

Minimum fisheries management requirements

People and accountabilities – A critical mass of appropriate staff is required to carry out the core functions associated with managing fisheries. To be effective, reporting relationships must be clearly defined, each staff member must have specific accountabilities, and there must be funding for essential elements such as communication, transportation, etc. The number of staff will vary depending on the circumstances, including the extent to which stakeholders assume some responsibilities through co-management agreements.

Information - Information is needed to support decisions, including a basic understanding of the resource status for the main species harvested, a record of who is involved in the fishery and their operations (where they fish, when, method of fishing) and a record of fish landings.

Decision-making process - A transparent process for making decisions is needed. The process should be timely, capable of reaching decisions on controversial issues and provide for public participation. For example, when faced with a situation of declining fisheries resources, the decision-making process should be capable of bringing key interests together and result in a series of actions that respond to the concern before it is too late.

Rules – The rules that govern a fishery must be well-understood by those involved in the fishery. The rules can be clearly articulated through policy, objectives, legislation and regulation. In many fisheries, the rules centre on access and allocation arrangements – who can fish and under what conditions (when, where, how, etc.).

Compliance – To be effective, it is essential that there be a way to promote compliance with the rules once they are established. This involves creating incentives for those involved in the fishery to follow the rules - a significant probability of being caught if one breaks the rules and a penalty that acts as a deterrence.

6. TRANSITION CONSIDERATIONS

> *"Despite considerable progress, (such as collaborative efforts to implement the Code of Conduct for Responsible Fishing [CCRF] for the Asian Region made by the Southeast Asian Fisheries Development Centre [SEAFDEC] and FAO), commitments made in these instruments have not been fulfilled. While the instruments identify most of the actions required to restore and maintain the health of the world's fisheries, the lack of resources required to reduce fishing capacity, the many interests involved, and the lack of political will at the national level to implement tough fleet reduction programs, have severely hampered their effectiveness."*[13]

Much of this paper has been dedicated to describing the main features of effective fisheries management regimes and providing examples of best practices in use throughout the world. Indeed, over the past thirty years many papers have been written about fisheries problems, their implications and management actions that can provide solutions. Our experience with fisheries management tools (input controls, output controls, etc.) has provided valuable insights into how various management approaches perform. In addition, international laws, principles and guidelines combined with domestic legislation provide the legal authority to adopt fisheries management approaches that have been successfully applied. Why then, are so few fisheries in the world considered effectively managed?

Part of the answer can be attributed to the difficulties associated with moving from one management regime to another. The move to effective and sustainable fisheries usually entails significant impacts on those associated with the fishery – harvesters, processors, marketers, equipments suppliers, boat builders, etc. For example, it is difficult to curtail fishing when it represents a critical food source for the community. As a result, quite often fisheries management changes are introduced only when conditions in the fishery become intolerable (e.g. stock failure) and something must be done to finally address the situation.

In some instances, fisheries management reforms are driven by the opportunity to derive greater benefits from the fishery rather than an impending disaster. In these situations, the impetus can come from government or the private sector. For example, in Namibia, it was the government that launched fisheries management reforms in the early 1990s, in part, to meet economic and national development objectives. Similarly, the move to individual quotas in many fisheries has occurred as a result of fishing industry representatives proposing such a change to government officials to improve the financial returns generated in the fishery.

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[13] The World Bank, Agriculture and Rural Development Department, *Saving Fish and Fishers – Towards Sustainable and Equitable Governance of the Global Fishing Sector* (Report No. 29090), May 2004, p4.

This section draws on the experience of several countries to highlight key considerations associated with the transition from one management regime to another.

- Making fundamental fisheries management changes should be guided by a clear and comprehensive plan for the fisheries sector and ideally this plan should be aligned with a broader socio-economic strategy.
- Providing stakeholders an opportunity to participate in the change process and influence the ultimate outcome is essential.
- The level of support for key features of a management regime will ultimately determine its success or failure. If the majority of participants do not believe in and support the management regime, it will be very difficult to gain compliance.
- Given that many individuals have a strong vested interest in the status quo or hold opposing views on what changes might be appropriate (based on the anticipated impacts on them), there must be an effective way to deal with conflicts.
- Assistance should be provided to those negatively affected by changes especially those with few alternatives for self-reliance. Just because there will be individuals negatively affected by a move to sustainable fisheries is not a reason to maintain the status quo. Instead, assistance such as licence retirement, vessel buy-back and community adjustment funding should be considered.
- To support developing countries in establishing sustainable fisheries management regimes, governments and other donors should help create mechanisms to resolve conflict and assist individuals negatively affected.
- When "negotiating" fisheries management reforms with stakeholders, ensure that the proper linkages are made – e.g. if fisheries management changes will improve the economic performance of a fishery, it is important that features such as rent recovery or cost sharing arrangements are clarified at the same time and incorporated into a comprehensive strategy.
- Change will not happen without strong leadership from the major sources of influence – political (e.g. the Minister of Fisheries), the fisheries management agency and the stakeholder community.

7. SUMMARY AND CONCLUSION

This report contains many examples of best practices in fisheries management and identifies the potential to use these practices more broadly. A brief summary of the main findings follows.

- Managing fisheries in a sustainable and efficient manner is difficult not because we do not know how but rather because it involves making changes that may have a profound impact on the lives of those involved in the fishery by altering the flow and distribution of benefits derived from the fishery.
- There is no such thing as a perfect fisheries management regime. The examples of best practices in this report simply highlight fisheries management reforms that have resulted in improvements in meeting the most important objectives for a particular fishery.
- Many best practices are transferable – that is, the benefits of a particular approach can achieve similar benefits when applied in different jurisdictions. That said, fisheries management regimes should be designed to meet specific circumstances, needs and objectives.
- The job of managing fisheries involves many interrelated functions and activities. To be effective, a fisheries management regime needs to be credible in all five of the key areas identified:
    - Policy and objectives
    - Legislation and regulations
    - Institutional arrangements and capacity
    - Decision-making process
    - Applied fisheries management activities (research, administration and management, compliance and enforcement)

For example, great policy and legislation will not go far without the institutional capacity to implement it and strong institutional capacity will not be effective without policy and legislative tools.

- Effective fisheries management requires integration across disciplines – biological sciences, social sciences, operations, legal services, communications, etc.
- Effective fisheries management can not be imposed without enormous human and financial costs. Fisheries management is essentially about managing people and requires the active involvement and support of those involved.
- Involving individuals or communities in fisheries management requires an appropriate governance structure.
- People respond to incentives and therefore management regimes can encourage efficiency or inefficiency. Sustainable fishing occurs when the governance structure encourages individuals to behave in a way that is socially desirable.
- Making the transition to an efficient and sustainable fisheries management regime requires an number of elements, including a comprehensive strategy, strong leadership, stakeholder involvement and assistance for those negatively affected.
- In particular, developing countries need help in establishing sustainable fisheries management regimes and therefore governments and other donors should provide assistance (financial and technical).

To conclude, there is much to be learned from examining best practices presented in this paper. Perhaps the main lesson is that sustainable and efficient management of fisheries is possible but requires a high level of commitment to make the necessary changes.

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ANNEX 1: LOW-INCOME FOOD-DEFICIT COUNTRIES

This annex lists the Low-Income Food-Deficit Countries (LIFDC) as of September 2004. The list stands at 84 countries.

Africa

Angola
Benin
Burkina Faso
Burundi
Cameroon
Cape Verde
Central African Republic
Chad
Comoros
Congo
Côte d'Ivoire
Democratic Republic of the Congo
Equatorial Guinea
Eritrea
Ethiopia
Gambia
Ghana
Guinea
Guinea-Bissau
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritania
Morocco
Mozambique
Niger
Nigeria
Rwanda
Sao Tome and Principe
Senegal
Sierra Leone
Swaziland
Togo
Uganda
United Republic of Tanzania
Zambia
Zimbabwe

Asia

Bangladesh
Belarus
Bhutan
Cambodia
China
Democratic People's Republic of Korea
India
Indonesia
Kiribati
Lao People's Democratic Republic
Maldives
Mongolia
Nepal
Pakistan
Papua New Guinea
Philippines
Samoa
Solomon Islands
Sri Lanka
Timor-Leste
Tonga
Tuvalu
Uzbekistan
Vanuatu

Europe

Albania
Armenia
Azerbaijan
Bosnia and Herzegovina
Georgia

Latin America and the Caribbean

Ecuador
Haiti
Honduras
Nicaragua

Near East

Afghanistan
Djibouti
Egypt
Iran (Islamic Republic of)
Kyrgyzstan
Somalia
Sudan
Syrian Arab Republic
Tajikistan
Turkmenistan
Yemen

FINANCING FISHERIES MANAGEMENT IN LIFDCs

Paul Macgillivray[1]

Macgillivray, P. 2008. Financing fisheries management in LIFDCS. In R. Metzner (comp.). Report of the Expert Consultation on Low-cost Fisheries Management Strategies and Cost Recovery. Georgetown, Guyana, 4–7 September 2007. *FAO Fisheries and Aquaculture Report*. No. 853. Rome, FAO. pp. 55–75.

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[1] Note: This document has been prepared based on the substantive contribution of Mr Paul Macgillivray during his stay in FAO headquarters Rome as a Visiting Scientist. The opinions expressed in this document belong to the author and do not reflect necessarily the views of the Food and Agriculture Organization of the United Nations. Current address: Mr. Paul Macgillivray, Associate Regional Director General, Fisheries and Oceans Canada – Pacific Region, Vancouver, B.C., Canada.

ACRONYMS/ABBREVIATIONS

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EEZ	exclusive economic zone
FAO	Food and Agriculture Organization of the United Nations
ITQ	individual transferable quota
LIFDC	Low-Income Food-Deficit Country
OECD	Organization for Economic Co-operation and Development
TAC	total allowable catch
UNCLOS	United Nations Convention on the Law of the Sea

1. INTRODUCTION

1.1 Purpose

There is a growing recognition among fisheries managers and resource economists of the importance of addressing issues associated with the cost of fisheries management activities.

The level of funding available for managing fisheries is an important consideration, particularly in Low-Income Food-Deficit Countries (LIFDCs)[2] where public funding is extremely limited. In addition, the ability of fisheries management agencies to meet their objectives is affected by several other financial factors such as the source of the funding, what activities are funded, who delivers the fisheries management services and what role stakeholders play in the decision-making process.

The purpose of this report is to explore funding arrangements that have the potential to support fisheries management activities in LIFDCs. Funding issues are examined in detail to gain an insight into the potential to realize greater benefits from fisheries resources through the application of appropriate funding arrangements to support essential fisheries management activities.

1.2 Background

This report was written in preparation for an FAO Expert Consultation on Low Cost Fisheries Management Strategies and Cost Recovery. The consultation was designed to address the following three key questions:

- How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?
- Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)?
- Who is best situated to provide specific fisheries management services (government or private sector)?

According to standard economic theory, the primary rationale for government intervention in regulating fisheries is to address inefficiencies associated with common property resource extraction. That is, the absence of property rights for fish typically results in a market failure characterized by excess fishing capacity, stock depletion, and the loss of resource rents.

Over the past fifty years, there has been a great deal of attention paid to addressing the negative externalities associated with common property by introducing government regulation and control over fisheries. The use of total allowable catches, limited entry, restrictions on fishing vessels and gear, and individual catch quotas have become common in many jurisdictions.

By contrast, the considerable expenditures dedicated to fisheries management activities have received less attention until recently. However, it is becoming increasingly apparent that more research is required in this area. A recent OECD report states:

> *"The inability to properly identify, track and report on costs may compromise the capacity to make appropriate and well founded decisions about changes in fisheries management policies and systems, and to evaluate the effectiveness of management decisions. Transparency helps to improve the accountability of management and informs and assists policy makers in ensuring an appropriate understanding of the cost implications (and potential benefits) of policy changes."* (OECD, *The Costs of Managing Fisheries*, 2003)

In addition, many fisheries management agencies are confronted with escalating demands for fisheries management activities and declining budgets. This situation has raised the profile of fisheries management funding in recent years.

This report examines major fisheries management funding issues and provides examples of funding arrangements from several countries. Particular attention is paid to developing countries where the challenges are greatest and it is widely recognized that help is needed to achieve sustainable fisheries objectives. For example, the World Summit on Sustainable Development (WSSD) called on the international community to take specific actions to maintain and restore the world's fish stocks by the year 2015. The goals include:

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[2] Refer to Annex 1 for a list of LIFDCs.

> *"Assist developing countries in coordinating policies and programs at the regional level aimed at the conservation and sustainable management of fishery resources.*
>
> *"Strengthen donor coordination and partnerships among international financial institutions, bilateral agencies, and other relevant stakeholders to enable developing countries to develop their national, regional, and subregional capacities for infrastructure and integrated management and the sustainable use of fisheries."*

Similarly, the challenges faced by developing countries in funding fisheries management activities are noted in the Code of Conduct for Responsible Fisheries which states:

> *"5.1 The capacity of developing countries to implement the recommendations of this Code should be duly taken into account.*
>
> *5.2 In order to achieve the objectives of this Code and to support its effective implementation, countries, relevant international organizations, whether governmental or non-governmental, and financial institutions should give full recognition to the special circumstances and requirements of developing countries, including in particular the least-developed among them, and small island developing countries. States, relevant intergovernmental and non-governmental organizations and financial institutions should work for the adoption of measures to address the needs of developing countries, especially in the areas of financial and technical assistance, technology transfer, training and scientific cooperation and in enhancing their ability to develop their own fisheries as well as to participate in high seas fisheries, including access to such fisheries."*

Section 2 of this report contains an overview of fisheries management funding arrangements. Section 3 presents selected examples of funding arrangements from a variety of countries. Section 4 provides an analysis of the funding arrangements with a view to identifying practices that may be applied more broadly. A summary and conclusions are presented in Section 5.

2. OVERVIEW OF FISHERIES MANAGEMENT FUNDING

This section provides an overview of fisheries management funding arrangements. Specifically, the following issues are covered:

- Level of Funding Dedicated to Fisheries Management Activities
- Funding Arrangements
- Delivery of Fisheries Management Services
- Role of Stakeholders in the Decision-Making Process

2.1 Level of funding dedicated to fisheries management activities

While information is generally available on the annual quantity and value of fish landings on a country-by-country basis (e.g. FAO Fishery Country Profiles), information on the cost of managing fisheries is more difficult to access. However, there is a growing recognition that analysis of fisheries management costs can lead to more informed decisions and efficiency gains in the fisheries sector.

For the purposes of this report, fisheries management expenditures are grouped into the following categories – research, administration and management, and, compliance and enforcement.

> *Research* –- Research is conducted to inform fisheries management decisions. Research activities in support of fisheries management tend to focus on two fields – biological information (e.g. stock assessments, related ecosystem considerations, biodiversity, etc) and socio-economic information (e.g. income and employment). For example, when a harvest strategy is being developed biological research is generally sought to gain an understanding of the likely impact of alternative harvest levels on the size of the fish stock biomass. Socio-economic research can be very helpful in informing decisions on alternative fisheries management measures by estimating the associated costs and benefits.

> *Administration and management* – This aspect of fisheries management involves developing fisheries management plans and administering ongoing arrangements (e.g. issuing fishing licences, monitoring fishing, recording catches, etc.). In addition, administration and management includes developing recommendations to change fisheries management approaches (e.g. limiting entry to the fishery, establishing a fish allocation policy among various user groups, etc.).
>
> *Compliance and enforcement* – Compliance involves creating a reasonable deterrence for individuals who might be inclined to operate outside the established fisheries management rules. Deterrence is created by ensuring that there is a significant probability of being caught if operating illegally combined with a penalty that acts as an incentive to follow the rules. Activities such as monitoring, surveillance and control are designed to detect violations while penalties can be either established through the courts or through an administrative sanctions process.

Many governments also dedicate public resources to developing and supporting their domestic fisheries. Such support involves assisting citizens acquire fishing boats as well as providing access to fish landing and fish processing facilities. Government expenditures on these types of activities have been phased out in many countries. For example, in countries that provided public funding for functions such as fishing gear and vessel design, fish product and quality development, marketing, etc, the private sector is now expected to carry out these activities.

2.2 Existing types of funding arrangements

In addition to understanding the overall cost of fisheries management activities, it is important to consider how fisheries management activities are funded and who provides fisheries management services (government or private sector).

> "... how we finance fishery management matters: who pays and how they pay for management services influences the performance of a fishery... Management costs are sometimes acknowledged, but not systematically accounted for in the analysis of policy. We rarely analyse behavior of individuals and agencies in the public sector by applying the common tools of economic analysis, to ask whether the underlying conditions promote government failure or success."
>
> (Andersen, P., J.G. Sutinen and K. Cochran, "*Paying for Fisheries Management: Economic Implications of Alternative Methods of Financing Fisheries Management*", 1998)

This section describes four arrangements associated with fisheries management funding.

- Direct Government Funding
- Cost Recovery for Specific Activities and Fees That Generate Revenue for Government (e.g. rent recovery)
- Delegation of Certain Responsibilities
- Donor Assistance

2.2.1 Direct government funding

Worldwide, it is common for governments to directly fund fisheries management activities through normal appropriations. Funding decisions are influenced by the overall availability of public resources to the government, the level of priority assigned to the fisheries sector, and the specific demands associated with fisheries management regime.

In addition to funding through normal government appropriations, there are provisions in many countries direct revenue from specific sources to fisheries management activities. For example, a portion of licence fee revenue may be automatically allocated to the fisheries management agency or revenue from certain violations (fines) may be used to fund specific fisheries-related management activities (e.g. fish habitat restoration and enforcement).

2.2.2 Cost recovery and fees providing revenue to government

Frequently, in addition to direct government funding some countries have a policy of cost recovery where a portion of the fisheries management costs are recouped from specific user groups (e.g. domestic commercial fishers, foreign fishers, recreational anglers).

The rationale for such cost recovery is that those who benefit from fisheries management activities should contribute to their funding. Under such arrangements, there is a distinction between expenditures that produce benefits for a specific user group versus expenditures that produce benefits for the broader community. For example, the provision of stock assessment advice to determine the appropriate level of harvest for a specific fishery produces private benefits for the participants in that fishery. In contrast, patrolling a 200-mile EEZ may be viewed a national security issue which benefits the broader community.

Separate from cost recovery, government may charge for access to fisheries resources. The rationale for these types of fees is linked to the granting of privileged access to public resources - that is, those who benefit from a public resource should pay a fee reflecting the value of the fishing privilege. Underlying access fees is the concept of resource rent which, in effect, recognizes that fish stocks have value and the public should receive a reasonable return for granting privileged access to public resources.

2.2.3 Delegation of certain responsibilities

In many countries, the delivery of fisheries management services is seen as the responsibility of government and service delivery is largely undertaken by the public sector. For example, government agencies typically are responsible for activities such as gathering data on catch, fishing effort, biological characteristics of the harvest as well as conducting stock assessment analysis, developing annual fisheries management plans and carrying out enforcement activities.

While some aspects of fisheries management are considered the exclusive prevue of governments (e.g. setting policy), there are many fisheries management services that can be effectively delegated by government to non-government groups (e.g. conducting research). In some countries, arrangements have been established whereby certain responsibilities are formally delegated by government to a non-government organization.

2.2.4 Donor assistance

Donor assistance related to fisheries is very common in many parts of the world. There are numerous donors, including global organizations such as the UN and World Bank, regional organizations such as the Asia Development Bank, national government assistance agencies such as the Japan International Cooperation Agency and , and non-government organizations such as WWF and private foundations.

An OECD report - "Impacts of Development Assistance: Lessons Learned For Better Fisheries And Aquaculture Governance (March 2006) - notes that:

> *"The multilateral assistance has been directed for a long time towards the development of industrial fishing capacity, the construction of harbour infrastructures or processing plants. For the last few years, one has noted a reorientation towards the institutional support and the integrated ecosystem or fisheries management, ..."*

Similarly, changes in fisheries-related donor assistance over time were characterized as phases in a recent presentation at the PROFISH Forum (March 2007):

- "*Phase 1: Direct production inputs; boats, gear, motors, ice-making machinery, etc*
- *Phase 2: Technical training; technical experts, local training institutions, training abroad*
- *Phase 3: Framework and management; laws, fisheries regulations, management training, management experts*
- *Phase 4: Monitoring, control and surveillance; (boats, planes, software, training)*
- *Phase 5: Co-management, institution building; setting up new institutions, modify old ones*
- *Phase 6: Regional programmes, rights-based management (licences, IQs, IVQs, ITQs, community* quotas, etc.) ..."

2.3 Delivery of fisheries management services

Given the common property nature of fisheries resources, governments tend to play a prominent role in all aspects of fisheries management. This generally involves establishing formal organizational structures to ensure mandated objectives are achieved (e.g. a fisheries department), hiring skilled staff and carrying out specific activities such as those described above - research; administration and management; and, compliance and enforcement. The nature and extent of the services provided is influenced by national policy.

In recent years, some governments have sought to improve the cost effectiveness of fisheries management by allowing the private sector to delivery many of the services traditionally provided by government agencies. This has involved identifying those services that are well-suited to private sector delivery versus functions that should remain in government. For example, developing national fisheries policy, establishing allowable harvest levels and meeting legal obligations to consult with specific groups are all functions that governments should retain. Alternatively, whether fisheries services are paid for by government or stakeholders, the private sector is well-positioned to deliver many fisheries management services including research, on-vessel observer coverage, dockside catch monitoring, to name a few. There are numerous examples of private sector delivery of fisheries management services described later in this paper.

2.4 Role of stakeholders in the decision-making process

It is common for stakeholders to be involved in fisheries management in an advisory capacity, often through formal consultative arrangements established by fisheries management agencies. The relationship between government and stakeholders is sometimes influenced by funding arrangements. In particular, where cost recovery provisions are in place stakeholders tend to be more active in the design and delivery of those particular services (e.g. seeking greater efficiency in service delivery).

However, cost recovery arrangements and the delegation of responsibility for the provision of specific fisheries management service should not be confused with devolution of decision making authority. Delivering a management service, such as dockside monitoring, is very different from making decisions regarding conservation of the fisheries resource, opening and closing of the fishery and approval of management plans. Decision-making authority for fundamental aspects of fisheries management generally rests with government and standards are often established by government for those services that are paid for and/or delivered by the private sector. Non-government participants have flexibility with respect to how the service is delivered to meet the standard.

3. EXAMPLES OF CURRENT FUNDING ARRANGEMENTS

This section provides examples of fisheries management funding arrangements used in a variety of countries.

3.1 Level of funding dedicated to fisheries management activities

The overall level of funding dedicated to fisheries management varies considerably from country-to-country as does the allocation of funds among the major fisheries management activities.

In 1999, it is estimated that OECD countries spent a total of $2.5 billion (US$) on managing marine fisheries. Among the OECD member countries there was a considerable variance in expenditures with Mexico and Turkey spending less than $1 million each while the EU and the USA each spent more than $600 million. Likewise, there was considerable variance among countries in the proportion of funding dedicated to specific fisheries management activities. On average enforcement accounted for the largest share of expenditures (39.6 percent) followed by research (34 percent) and management (26.4 percent). Refer to Table 1 below for details.

Comparing the cost of fisheries management to the value of fish production in OECD countries highlights some interesting differences among countries.

> “Canada and the United States have relatively high unit costs in terms of both the volume and value of production. In contrast, Iceland has one of the lowest costs relative to both the value and volume of production, compared to other OECD countries.” (The Costs of Managing Fisheries, OECD, 2003, pg. 30).

Aside from the information presented above, comprehensive data on fisheries management expenditures are not readily available. In many instances, government agencies are responsible for more than fisheries management and budgets are not reported in a way that allows identification of fisheries management expenditures. In addition, many agencies are involved in fisheries development, operating a government fishing enterprise or government service (e.g. subsidized boat building, ice making, etc.) and some agencies are responsible for indigenous business development.

Table: Costs of managing fisheries in OECD Countries – 1999 (US$ million)

Country	Research costs	Management costs	Enforcement costs	Total costs	Total cost relative to value of production (%)
Australia	45.7	16.8	30.8	93.3	8.5
Canada	52.4	60.4	50.3	163.2	14.1
European Union	232.1	118.2	265.0	615.4	10.0
Iceland	13.5	2.0	11.9	27.4	3.3
Japan*	219.9	140.7	105.6	466.2	2.9
Korea	28.3	47.9	246.1	322.3	9.5
Mexico	0.3	0.4	0.01	0.7	0.1
New Zealand	7.9	11.1	9.0	28.0	…
Norway	30.2	9.6	82.8	122.6	9.7
Turkey**	0.1	0.3	na	0.4	38.5
USA***	202.5	240.5	170.5	613.5	17
Total OECD	**832.9**	**647.9**	**972.0**	**2452.8**	

* Data are for 2000.
** Management and enforcement costs are combined.
*** Data relate to appropriations for fiscal year 2000.
(Source: The Costs of Managing Fisheries, OECD, 2003)

In some instances, funding for fisheries management is linked to the value of fish production. For example, in Mozambique the fisheries Master Plan established parameters for government expenditures based on an index of 2.5 percent of the fish production value. The Master Plan estimated that the fish production value would be between US$182M in 2000 to US$209M in 2005. However, the actual production value was lower than estimated (e.g. US$132M in 2002) and the public sector budget was limited to US$1.5M to US$2.2M in the early 2000s (corresponding to 1.15 percent to 2 percent of the fish production value).

3.2 Funding arrangements

This section presents examples of various fisheries management funding arrangements currently in use throughout the world.

3.2.1 Direct Government funding

Worldwide, fisheries management costs are funded predominately by governments with agencies responsible for fisheries management receiving annual budgets as part of the normal appropriations.

Some countries, such as Japan and Korea, have stated that the provision of fisheries management services is a public function and should be entirely financed by the government. In many other countries, there is no such policy but in practice fisheries management costs are paid by government (general revenues or special budget allocations) and donor assistance.

Examples of direct government funding for fisheries management are presented below.

> *Republic of Mauritius* –- The work of the Ministry of Fisheries (administration, research, monitoring and control) is geared towards the management and development of fisheries and conservation of the marine living resources. All the services provided are covered from public funding with only minor inputs from other sources such as bilateral assistance in research programmes and consultancies. All fees collected go to general government revenues and therefore are not directly linked to the provision of fisheries management activities.
>
> *Maldives* – The principle funding source for management of fisheries resources is the general government budget and there is no monetary contribution from the private sector.
>
> *Malaysia* –- The Government of Malaysia provides funding for fisheries management activities. Revenues from fisheries licensing and penalties flow directly to central government revenues and are not linked to departmental management costs or budgets.

3.2.2 Cost Recovery and fees that generate revenue for government

Some countries have introduced cost recovery programmes for specific fisheries management activities. Generally, cost recovery provisions have been applied in industrial fisheries but not to subsistence, artisanal and recreational fisheries.

In several countries, comprehensive national approaches to cost recovery have been put in place with explicit guidelines that dictate which costs are to be recouped from the fishery. Several examples are presented below.

Australia

- Since the mid-1980s, Australia has moved progressively toward applying cost recovery principles in Commonwealth fisheries.
- The commercial fishing industry pays for costs directly related to the fishing activity while the Commonwealth pays for management activities that benefit the broader community.
- A two-stage process is used to determine who pays for fisheries management costs. First, costs are assessed to determine if the activity is "attributable" to a specific user group or to the community at large. Second, activities attributed to a specific user group are examined to determine if the costs should be recovered from these groups. Factors considered in determining whether costs are recoverable or non-recoverable include the extent to which a user group benefits from the activity, the existence of extenuating socio-economic considerations and the cost-effectiveness of recovering the costs of a particular activity.
- It is estimated that about one-quarter of total Commonwealth fisheries management costs are recovered.

New Zealand

- Since 1994, New Zealand has recovered a portion of the costs associated with managing commercial fisheries.
- Initially, the approach to cost recovery was based on the "avoidable cost" principle where, as a matter of administrative practice, the government attempted to recover all costs incurred by the Government due to the existence of the commercial fishing industry. This approach was very unpopular with the fishing industry.
- Following a review of the Fisheries Act in 1999, there was agreement to change the approach to cost recovery. The current Fisheries Act contains the following principles: persons who request a service must pay for that service; costs of services "provided in the general public interest, rather than in the interest of an identifiable person or class of person" cannot be recovered and are borne by the Crown; costs must, so far as practicable, be "attributed" to the persons who benefit from the expenditure; and, persons who cause risk to or an adverse effect on the aquatic environment must, as far as practicable, pay the costs of services required to manage those risks or adverse effects.

Tanzania

- The National Fisheries Sector Policy and Strategy Statement (1997) defines the main fiscal objective for the fisheries sector as follows – "finance administrative, management and development programmes from its own sources".
- Revenue generation from the fisheries sector not only finances fisheries programmes but also provides revenue for the national treasury to fund other government priorities.
- The main instruments used to generate revenue are licensing industrial vessels, export licences and export royalties.

Namibia

- In Namibia, the total fees extracted from the fishing industry, amount to a significant fraction of the industry's total revenues. From 1994 to 1999 these fees averaged almost 9 percent of the industry revenues on average.

- Of this income, about 3/4 is accounted for by the quota fees. Moreover, this income substantially exceeded the fisheries management costs (research, administration and enforcement) which averaged about 5 percent of industry revenues during the same period.
- Thus, Namibia is one of the very few if not the only country in the world where the treasury directly collects a positive net income from the fisheries. (Arnason, 2002)

In a number of other countries, while there is no comprehensive policy on cost recovery, there are various arrangements by which fisheries management costs are recouped. Several examples of activity-specific or fishery-specific cost recovery arrangements are presented below.

Papua New Guinea (PNG)

- In the mid-1990s, PNG established a National Fisheries Authority (NFA) to replace the former Department of Fisheries and Marine Resources. The NFA has a more commercial orientation than its predecessor and a degree of fiscal autonomy.
- The NFA is able to maintain and finance its operation from revenue it raises. Most of the revenue comes from access fees paid by foreign fleets while other sources include, assistance from donor agencies, fines from successful prosecutions of fisheries-related violations and a number of other fees (e.g. application fees, mandatory licence fees, foreign fishermen fees, national crew fees, buyers licence fees, storage licence fees, factory licence fees, export licence fees).
- Any surplus profit declared by the NFA goes to the national treasury to fund broader government priorities.

South Africa

- Industry taxes and levies are paid into a "Marine Living Resources Fund" (MLRF).
- In recent years, a policy change was introduced that sees these revenues recovered from the fishing industry allocated to the MLRF and the fisheries management agency was given greater autonomy to administer these funds for research and compliance.
- There are other sources of funding for fisheries management including International donor funds and alternative research funding through the National Research Foundation.

Mozambique

- Government revenue generated directly from the fisheries sector were US$3.8M in 2002.
- Revenues available to Government as a result of fishing activities are clearly ear-marked, with 40 percent going to the Ministry of Finance, 50 percent to a Fishery Investment Fund, which provides credit to fishers and allows for capacity-building and 10 percent to the Ministry of Fisheries.

Namibia

- In Namibia, there are two levies that are used to fund specific activities. The Marine Resources Fund Levies finances the research activities of the Ministry as well as a number of training initiatives while the Fisheries Observer Fund Levies are used to fund the Fisheries Observer Agency.

Canada

- In some fisheries, commercial harvesters pay for various fisheries management activities including, research, on-vessel fishery observers and dockside catch monitors.
- In some fisheries, a portion of the total allowable catch is allocated to a fishers association as part of a co-management agreement that includes the fishers paying for specific fisheries management activities (e.g. Pacific Halibut).

3.2.3 Mechanisms used to collect fees

The four most common mechanisms used to collect fisheries-related fees are described below.

Access fees/licence fees – Many countries charge a fee for access to their fishing grounds. Generally, the fees charged to foreign fishing fleets is considerably higher than the fees for domestic vessels and in some instances, foreign vessel access fees represent a significant source of government revenue.

Auction – Although not widely used, access to fisheries is granted in some instances through an auction whereby the highest bidders are granted harvesting licences.

Fish landings charges – A fee based on fish landings is used in many countries whereby a fixed price per kg is charged on commercial fish landings.

Export licences and royalties on fish exports – Fees on fish and fish products that are exported are common in many countries.

A wide range of other fees are in use, including mandatory payments for vessel registration, fisher registration, industrial fish processing licences, health inspection certificates, etc.

Examples of specific fee arrangements in various countries are presented below.

Pacific Island countries – Example of access fees

- In some Pacific Island countries, the generation of national government revenue from foreign fishing activity is a major objective of fisheries management. In the Federated States of Micronesia the generation of national government revenue from licensing foreign fishing activity is a major objective of fisheries management. In 1999, access fees represented an estimated 39 percent of non-tax revenue and 22 percent of total domestic revenue for the government.

Canada – Example of access fees

- In Canada, charging domestic harvesters access fees is a significant source of revenue for government. In 1996, Canada introduced a new fee structure that requires commercial harvesters to pay access fees based on a percentage of the average landed value in the fishery (up to 5 percent of the landed value in some fisheries).

United States of America – Example of auction

- Management of the Washington State geoduck fishery involves auctioning of quotas available for harvest in defined areas.
- The auction process has the following features:
    - Open to all interested and responsible bidders
    - Geoducks are auctioned as quotas of pounds available to harvest from specifically-defined tracts
    - Typically, 10–15 quotas are auctioned with each quota ranging in size from 10 000 pounds to 70 000 pounds
    - A plan of operations must be submitted by highest bidder prior to harvest contract being awarded.
    - Annual revenue generated from auctions ranged from about US$4 million to over US$10 million during the period 1993 to 2004.
    - Revenue from auction funds management and protection of state aquatic resources.

Chile – Example of auction

- In Chile, there are four fisheries using ITQ management where the quota is allocated by auction. Each year 10 percent of the outstanding quota is auctioned off. This means that each company's holdings are reduced by 10 percent every year. But the companies can replenish their holdings by successful bids in the annual auctions.

Tanzania – Example of export fees

- In Tanzania, the key fiscal objective for the fisheries sector is defined in the National Fisheries Sector Policy and Strategy Statement as to "finance administrative, management and development programmes from its own sources." An export royalty is charged on principle fish exports on a per kg basis (about 6 percent FOB).

- The royalty is collected by the Fisheries Department, and export documentation requires the inclusion of a receipt showing payment of royalty. Charges are made on a per kilo basis in all cases except for seashells and aquarium fish, which are charged ad valorem.

Denmark – Example of landings charges

- " … all Danish vessels pay 0.3 percent of the value of their catches to the Danish Fishing Landing Fund. The purpose of the fund is to improve the development of the fishing industry by supporting various actions such as: stock assessment, improvement and adjustment of the structure of the fishing sector …" (Source: Andersen, P., J.G. Sutinen and K. Cochran, "Paying for Fisheries Management: Economic Implications of Alternative Methods of Financing Fisheries *Management*", 1998)

Iceland – Example of multiple fees

- Taxes and levies are payable by the industry to the government. This includes a fishing inspection fee and quota transfer fees when trading ITQs.
- An additional chapter to The Fisheries Act (No. 38, 15 May 1990) adopted in 2002 introduced a levy on fishing rights allocation for Icelandic vessels, also called a resource fee, operating both in and outside the EEZ. The levy is payable by fishing companies from the 1 September 2004 onwards.
- The resource fee is levied on gross profit, based on the EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization) system. The fee is based on the total value of landings minus labour costs, fuel costs, and other operating costs. Initially the tax is set at six per cent, but will rise to 9.5 per cent after seven years.

3.2.4 Delegation of certain responsibilities

There are a limited number of examples where governments have formally delegated fisheries management responsibilities to the private sector. One such example is the administration of the quota registry in New Zealand.

In New Zealand, the Fisheries Act 1996 provides for the devolution of some fisheries services to external organizations that then become responsible for ensuring the provision of the services, with the agreement of the Minister of Fisheries. In these instances, the Chief Executive of the Ministry of Fisheries is no longer accountable for provision of the service. Once functions, duties and powers are devolved to an external organization the specific related services become the sole responsibility of the organization to deliver. Failure to comply with the statute and standards and specifications can lead to civil sanctions imposed on the organization.

Many registry-based Quota Management System (QMS) services have been devolved or contracted to the New Zealand Seafood Industry Council Ltd (SeaFIC).[3] Commercial Fisheries Services, a wholly owned subsidiary of SeaFIC, delivers these services. It operates under the brand name 'FishServe'.

Functions, duties and powers devolved to FishServe include:

- Registering clients and vessels.
- Licensing fish receivers.
- Issuing catch return books and operating returns management processes including electronic data transfer for statutory reporting.
- Processing quota and annual catch entitlement transactions, including mortgages and caveats.
- Catch balancing.

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[3] SeaFIC is an industry owned limited liability company that represents the interests fishers, harvesters, the marine farming sector, processors, retailers and exporters. It provides professional advice to Government and the industry on fisheries management policies and practices and scientific issues.

In addition devolved services, FishServe provides services under contract to MFish. Contracted services include:

- Delivery of catch effort services, including issuing return books and the returns management process.
- Issuing fishing permits.
- Registering foreign owned vessels, charter vessels, and fish carriers.
- Monitoring catch limits.
- Delivery of revenue services, including invoicing, receiving and debt management of cost recovery and deemed values.

The government has retained a small core of staff to set standards and specifications and monitor the function. This happened because the government acknowledged its core competency was not managing an administrative system, and the industry wished to have direct control over the function to achieve cost and service efficiencies.

3.2.4 Donor assistance

Donor assistance is a critical aspect of fisheries management in many countries. A brief review of the assistance received by several countries follows.

Tonga

- Tonga has received substantial assistance with fisheries development programmes from a wide variety of sources, including FAO. Projects have variously been concerned with the provision of shore-based plant and equipment (buildings, ice plant, aquaculture centre, fisheries stations), fishing vessel construction, research, fisheries harbours, marketing and training.
- Presently the largest aid-supported fisheries project is the Australian Tonga Fisheries Project. The project will cost about US$2.6 million over a four year period and focuses on inshore fisheries management, development of offshore tuna fishing, small-scale fisheries development, and strengthening of the Ministry of Fisheries.

Namibia

- Considerable assistance has been received in fisheries development, management and training through external economic and technical assistance. All have been donor supported usually with a significant contribution in cash or in kind from the Namibian Government. Bi-lateral assistance has been provided, and many cases continues to be provided, by Norwegian Agency for Development Co-operation (NORAD), Australian International Development Assistance Bureau (AIDAB), Danish International Development Agency (DANIDA), Department for International Development (DFID) UK, Gesellschaft fur Technische Zusammenarbeit (GTZ), Germany, Centrum fur Internationale Migration und Entwicklung (CIM), Germany, Icelandic International Development Agency (ICEIDA), Iceland, Government of Spain, International Centre for Ocean Development (ICOD), Japanese International Cooperation Agency (JICA), and Fonds d'Aide et de Coopération (France).
- Multi-lateral assistance has been provided by: Food and Agriculture Organization (FAO), United Nations Industrial Development Organization (UNIDO), Commonwealth Fund for Technical Cooperation (CFTC), Global Environment Facility (GEF), and the European Union (EU).

Philippines

- In the Philippines, foreign assistance in the form of loans and grants shifted more to conservation and resource management after the late 1980s.
- An ongoing major fisheries project, Fisheries Improved for Sustainable Harvest (FISH) Project, builds upon the foundation and lessons learned from the USAID-funded Coastal Resource Management Project (CRMP) and other projects to achieve the next crucial benchmark in managing fisheries and coastal resources in the Philippines. This benchmark calls for integrated fisheries management driven by informed, disciplined and cooperative stakeholders at national and local levels of engagement.

3.3 Who delivers the fisheries management services

In most countries, the delivery of fisheries management services is undertaken by the public sector. However, there are many examples of specific services being contracted out to universities and the private sector.

> "*A large amount of research is undertaken on a contract and/or partnership basis in many OECD countries. This involves the central fisheries management agency contracting out research to universities, marine research laboratories and government marine research organizations, sometimes on a competitive basis…*"
>
> "*A number of OECD countries have also instituted the private provision of some enforcement services. In Norway, for example, the Sales Organizations play a prominent role in enforcement through the auditing of catch returns against quotas and licences and inspection of landing sites and processing plants.*" (Source: The Costs of Managing Fisheries, OECD, 2003, page 49)

Several examples of non-government delivery of fishing services in Canada are presented below.

Canada

- Stock assessment research in support of the Sablefish fishery on the Pacific coast of Canada is conducted by non-government scientists and paid for by the commercial fishing sector. Stock assessment papers are peer reviewed and are used in the government decision-making process in the same manner as research papers prepared by government scientists.
- A Dockside Monitoring Programme (DMP) was established on the Atlantic coast of Canada in 1989-90 to provide accurate and timely third-party monitoring of fish landings. At its inception, the DMP was introduced in fisheries that were adopting individual quota management. By the mid-1990s, DMP operated under full cost recovery and service delivery was turned over to private sector companies operating on a commercial basis.
- An At-Sea Observer Programme has been used in some Canadian fisheries for many years. Under this programme, services rendered by registered private sector observers onboard vessels while at sea. The at-sea observer fee programme in the Atlantic fisheries, initiated in 1977, was originally sponsored by the provincial government and then by DFO in 1978. The programme was turned over to third party contractors in 1980.

3.4 What role do stakeholders play in the decision-making process?

In many countries, stakeholder consultations are part of the fisheries management decision-making process. In practice, this means that there are committees comprised of various stakeholders that facilitate a two-way discussion on key issues. The outcome of these meetings informs decisions but typically the decision-making authority rests with the government.

In some instance, governments enter into co-management or partnership agreements with fishery stakeholders. These agreements often involve a sharing of responsibilities between government and the participants in a fishery.

In isolated instances, stakeholders are granted a prominent role in the decision-making process. In particular this occurs when a community leader (or a community group) is granted specific fisheries management authorities.

Examples of such arrangements are presented below.

Australia

- The Australian Fisheries Management Authority (AFMA) was established in 1992 as a statutory authority, governed by an independent board, to manage Commonwealth fisheries.
- There is a strong emphasis on a co-operative partnership approach among key stakeholders, including fisheries managers, researchers, fishing operators, environment/conservation and recreational fishing interests (where appropriate) and other stakeholders, in the process of developing and implementing fisheries management arrangements.

- While AFMA pursues a cooperative management approach to enable relevant stakeholders to take part in management processes alongside fisheries managers, management decision-making powers are vested in the AFMA board.

United States of America

- The Magnuson Fishery Conservation and Management Act of 1976, created eight regional fishery councils to manage the living marine resources within that area. The Act was passed principally to address heavy foreign fishing, promote the development of a domestic fleet and link the fishing community more directly to the management process.
- "The councils' membership is a balance of commercial and recreational fisherman, marine scientists and state and federal fisheries managers, who combine their knowledge to prepare Fishery Management Plans (FMPs) for stocks of finfish, shellfish and crustaceans.
- In developing these FMPs the Councils use the most recent scientific assessments of the ecosystems involved with special consideration of the requirements of marine mammals, sea turtles and other protected resources. The FMPS are prepared through a planning process that includes the public comments provided by fishers and other persons concerned with the management of these resources. (Source: http://www.nmfs.noaa.gov/councils)

4. ANALYSIS AND FUTURE DIRECTIONS

4.1 Main constraints to improving fisheries management performance

Throughout the world, there are considerable challenges in establishing and operating sustainable fisheries management regimes. A short description of the main challenges follows.

Vested interests - The move to effective and sustainable fisheries often impacts the distribution of benefits derived by those associated with the fishery - harvesters, processors, marketers, equipments suppliers, boat builders, etc. As a result, fisheries management changes that could produce long-term benefits for the majority are often successfully resisted by individuals who have a strong vested interest in the status quo or hold opposing views on what changes might be appropriate (based on the anticipated impacts on them). Often, changes are introduced only when conditions in the fishery become intolerable (e.g. stock failure).

Governance – Over the past 50 years, one key observation has emerged from worldwide experience with managing fisheries open access to common property fisheries resources results in overfishing and stock decline. Yet, throughout the world governments commonly fail to introduce effective governance arrangements to address this situation. Two aspects of governance are particularly important. First, effective governance requires establishing appropriate access and allocation arrangements. Without security of access, fishery participants have little incentive to conserve the resource and harvest in an ecologically and economically sustainable manner. However, governments have a poor record in establishing such arrangements. Second, the nature of fisheries management results in conflicts among various interests as described above. Here too governments have a poor record of establishing governance arrangement that can reconcile conflicts between users (e.g. industrial vs. small-scale fishing fleets, commercial vs. recreational fishers, etc.)

Institutional capacity – Effective fisheries management is a multi-disciplinary operation requiring input from a variety of specialists including legal advisors, biologists, economists and enforcement officers. The ability to communicate effectively, engage in meaningful consultations and resolve conflicts are particularly valuable skills for everyone involved in fisheries management. The shortage of skilled individuals to work in fisheries management agencies is a critical issue in many parts of the world. In some instances, a great deal of effort is dedicated to providing training to individuals employed in fisheries management agencies. However, once trained these individuals have broader career opportunities and may be offered alternative employment outside the fisheries management agency. Without an ongoing focus on the development of skills, fisheries management agencies can be very fragile (e.g. risk a high turn-over of staff).

Lack of funding – Public funds allocated for fisheries management activities are rarely enough to meet all the demands. Therefore, it is important to identify alternative funding arrangements such as cost recovery, partnerships involving non-government organizations, co-management, etc. However, pursuing these types of arrangements usually require the fisheries management agency to become more transparent and accountable which many agencies are reluctant to do.

4.2 Key funding questions

As noted above, the FAO expert consultation is intended to focus on the following three questions.

- How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?
- Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)?
- Who is best situated to provide specific fisheries management services (government or private sector)?

Each of these questions is addressed below.

Question 1 - How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?

The allocation of scarce financial resources for fisheries management should done in the context of a clear strategy, including objectives, priorities and desired outcomes. Such a strategy should be developed by the fisheries management authority in conjunction with stakeholders. A multi-stage process can be effective in developing the strategy.

Stage 1

- Assign responsibility for the development of the strategy to a senior fisheries management agency person and compile a support team.
- Seek political support and leadership to pursue fisheries management reforms. At the outset, political direction from the responsible Minister on priorities and the political appetite for reforms are essential considerations.
- Prepare for consultations with stakeholders by designing a consultative process and presentation materials.
- Launch a consultative process to establish a common vision of what a sustainable and efficient fisheries regime is and how it can be achieved. It is critical that all the major stakeholder groups are represented and leaders within the stakeholder community play prominent roles in this consultative process.
- Begin consultations by describing the current state of the fishery and the outlook under the existing fisheries management approach. This will form the basis of a joint definition of the problems that should be addressed.
- Provide some guiding principles to help focus the discussion, including broad government priorities related to national or regional economic development as well as government priorities for the fisheries sector.
- Seek agreement on the main objectives that should be pursued in managing fisheries.

Stage 2

- Jointly identify fisheries management options that may be considered to achieve the objectives identified in stage 1.
- Systematically analyse each option relative to achieve key objectives and other considerations – e.g. biological management objectives, economic and social objectives, distributional impacts and net cost to government. In addition, ensure the analysis includes political considerations identified (e.g. those of the responsible Minister).
- Report findings of the analysis and seek consensus on a course of action that will best achieve the stated objectives. Clearly articulate major constraints that may limit the utility of a given option (e.g. government funding).

Stage 3

- Draft a comprehensive strategy, incorporating where appropriate components developed in Stage 2.

- The strategy should include the main building blocks that underpin successful fisheries management regimes – a clear articulation of objectives and policy, a plan to develop legislation and regulations where required, a plan to secure the appropriate institutional arrangements and capacity, and design an effective decision-making process.
- Seek political support for the draft strategy and modify as necessary.
- Provide an explanation when recommendations coming out of Stage 2 could not be incorporated into the strategy.
- Present the strategy to stakeholders and modify as necessary.
- Engage stakeholders in the implementation.

The approach outlined above is generic and must be tailored to the specific circumstances in a given country. However, the fundamental approach remains the same – develop a clear plan and utilize scarce resources to support implementation of the plan. In this way funding decisions are linked to objectives, priorities and desired outcomes.

Question 2 - Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)?

Potential sources of funding for fisheries management activities include government appropriations, contributions from participants in the fishery and donor assistance. Each is described briefly below.

4.2.1 Government funding

Governments generally contribute funding to fisheries management activities, although in many instances, the level of funding is very low.

Having a comprehensive fisheries strategy (as described above) can be very helpful in drawing attention to fisheries sector priorities within the broad national context and can form the basis for domestic budget allocations as well as international assistance (e.g. technical assistance, grants, loans, etc.).

Recognizing that public funding is limited, identify opportunities to earmark funds such as directing court-imposed fines to specific activities such as surveillance and enforcement.

4.2.3 Contribution from participants in the fishery

Fisheries management requirements can be accomplished more effectively if governments work in cooperation with stakeholders. Stakeholders are generally well-positioned to assist with many aspects of fisheries management but often lack any structured way to contribute. Stakeholder contributions to fisheries management can take many forms – provide advice on some aspects, play an active role in service delivery, assume specific responsibilities, provide funding, etc. However, it is essential that government take the lead in formally defining the role of stakeholders and reflect that role in the institutional arrangements associated with fisheries management.

The contribution of stakeholders is likely to vary form one country to another and among fisheries within a given country. For example, in industrial fisheries stakeholders can be expected to contribute financially towards achieving fisheries management objectives. In contrast, in artisanal fisheries, stakeholders are more likely to become involved in management by participating in the delivery of management activities rather than providing funding.

Where it is used, cost recovery has generally been introduced as part of a broader package of fisheries management reforms. In instances where user groups have assumed responsibility for funding specific fisheries management activities, strong incentives were created to improve the effectiveness and cost-efficiency in delivering those activities.

There are a variety of ways that funds can be raised and these were described in Section 3. Given the potential for a “fee rider” problem, government can play an instrumental role in facilitating the collection of fees from stakeholders (i.e. stakeholders generally do not have the authority to establish mandatory fees).

Experience has shown that where stakeholders contribute to the management of fisheries (financially or in kind services), they seek a greater voice in the design and implementation of the fisheries management regime. This is referred to the user pay - user say, although decision-making authorities generally remained unchanged.

4.2.3 Donor assistance

Financial and technical assistance from donors can play an important role in establishing an effective and sustainable fisheries management regime.

To get the most out of donor assistance care must be taken to match the priorities of the donor and the recipient, coordinate the efforts of various donors operating in a given location and avoid establishing an ongoing dependence on certain types of assistance.

A promising concept for cooperation between developing and industrial countries is the twinning of institutions. This could be a relationship between an institute in a developing country and a partner in an industrial country, or it could involve several institutes from both developing and industrial countries. The advantages of twinning lay in the extensive, well-organized and potentially long-lasting exchange of information and personnel and in the sharing of facilities that the concept envisions.

In some instances, countries can become very dependent on donor funding. An article “Aid has failed the Pacific”, by Helen Hughes highlighted the development problems that result from allowing countries to become almost totally dependent on donor funding to augment and run their programmes. Agencies sometimes include donor funding as part of annual budgeting, either directly, or indirectly. This phenomenon has resulted in the economic collapse of governments and limited the possibility of achieving a self-sustaining fisheries management regime.

Question 3 - Who is best situated to provide specific fisheries management services (government or private sector)?

There has been a move in many countries towards privatization of services that were for many years delivered by governments (e.g. the privatization of crown corporations such public electrical utilities and government-owned airlines). Likewise, the provision of some fisheries management services by the private sector is becoming increasingly common in many countries. Several examples were described in Section 3.

Although there are few evaluations of these experiences, it appears that there is a significant potential to achieve efficiency gains through private sector delivery of specific services.

5. SUMMARY AND CONCLUSIONS

There is a growing recognition of the importance of addressing issues associated with the cost of fisheries management activities. The level of funding available for managing fisheries is a major consideration, particularly in LIFDCs where public funding is extremely limited. Other important financial considerations include the potential for non-government funding, determining which fisheries management activities are funded, who delivers the fisheries management services and what role stakeholders play in the decision-making process.

Managing fisheries resources is a very demanding job and in most countries funding is provided by government. Typically, the level of funding provided by government falls far short of requests (from the fisheries management agency and stakeholders) and in many LIFDCs minimal direct government is available. Currently, many governments are under pressure to increase fisheries management funding. In addition to requests for more scientific research, fishery monitoring and enforcement, governments are facing an escalation in litigation and are asked to engage in stakeholder conflict resolution efforts.

The allocation of scarce financial resources for fisheries management should be carried out in the context of a clear strategy, including objectives, priorities and desired outcomes. Such a strategy should be developed by the fisheries management authority in conjunction with stakeholders. In addition, it is important to systematically track fisheries management expenditures and conduct ex-post analysis of to evaluate value for money spent, although few countries actually do this.

The delivery of fisheries management services can be accomplished more effectively if governments work in cooperation with stakeholders. Stakeholders are generally well-positioned to assist with many aspects of fisheries management but often lack any structured way to contribute. Stakeholder contributions to fisheries management can take many forms – provide advice on some aspects, play an active role in service delivery, assume specific responsibilities, provide funding, etc. However, it is essential that government take the lead in formally defining the role of stakeholders and reflecting that role in the institutional arrangements associated with fisheries management. In addition, governments must establish appropriate access and allocation arrangements. Without security of access, fishery participants have little incentive to conserve the resource and harvest in an ecologically and economically sustainable manner.

A variety of tools are available for governments to generate revenue from fisheries and share the financial responsibility of providing fisheries management services. These tools include access fees, fish landings charges, cost recovery fees and the delegation of some fisheries management responsibilities. It is important to be clear about the rationale for new fees (e.g. rent recovery vs. cost recovery).

In instances where user groups have assumed responsibility for funding specific fisheries management activities or direct delivery, strong incentives were created to improve the effectiveness and cost-efficiency in delivering those activities. That is, the stakeholders shift from simply asking government to provide more services to focusing on how best to get the job done. Stakeholders can not be expected to accept a shift to cost recovery in isolation of other changes. In particular, where it is used, cost recovery has generally been introduced as part of a broader package of fisheries management reforms that were designed, in part, to improve the overall financial performance of the fishery. In addition, stakeholders expect a greater voice in the management of the fishery to accompany accepting financial responsibility.

To get the most out of donor assistance care must be taken to match the priorities of the donor and the recipient, coordinate the efforts of various donors operating in a given location and avoid establishing an ongoing dependence on certain types of assistance. A promising concept for cooperation between developing and industrial countries is the twinning of institutions.

Increasingly, the private sector (including fishery participants), are becoming involved in the delivery of fisheries management services. In some instance, governments enter into co-management or partnership agreements with fishery stakeholders. These agreements often involve a sharing of responsibilities between government and the participants in a fishery.

Finally, it is generally acknowledged that stakeholders can play a valuable role in the fisheries management decision-making process. To be effective, this requires a clear definition of roles (government vs. non-government) and strong leadership both within fisheries management agencies and stakeholder groups.

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ANNEX 1: LOW-INCOME FOOD-DEFICIT COUNTRIES

This annex lists the Low-Income Food-Deficit Countries (LIFDC) as of September 2004. The list stands at 84 countries.

Africa
Angola
Benin
Burkina Faso
Burundi
Cameroon
Cape Verde
Central African Republic
Chad
Comoros
Congo
Côte d'Ivoire
Democratic Republic of the Congo
Equatorial Guinea
Eritrea
Ethiopia
Gambia
Ghana
Guinea
Guinea-Bissau
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritania
Morocco
Mozambique
Niger
Nigeria
Rwanda
Sao Tome and Principe
Senegal
Sierra Leone
Swaziland
Togo
Uganda
United Republic of Tanzania
Zambia
Zimbabwe

Asia
Bangladesh
Belarus
Bhutan
Cambodia
China
Democratic People's Republic of Korea
India
Indonesia
Kiribati
Lao People's Democratic Republic
Maldives
Mongolia
Nepal
Pakistan
Papua New Guinea
Philippines
Samoa
Solomon Islands
Sri Lanka
Timor-Leste
Tonga
Tuvalu
Uzbekistan
Vanuatu

Europe
Albania
Armenia
Azerbaijan
Bosnia and Herzegovina
Georgia

Latin America and the Caribbean
Ecuador
Haiti
Honduras
Nicaragua

Near East
Afghanistan
Djibouti
Egypt
Iran (Islamic Republic of)
Kyrgyzstan
Somalia
Sudan
Syrian Arab Republic
Tajikistan
Turkmenistan
Yemen

FINANCING FISHERIES MANAGEMENT: THE CASE OF SWEDEN

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Greig, G. 2008. Financing fisheries management: the case of Sweden. In R. Metzner (comp.). Report of the Expert Consultation on Low-cost Fisheries Management Strategies and Cost Recovery. Georgetown, Guyana, 4–7 September 2007. *FAO Fisheries and Aquaculture Report*. No. 853. Rome, FAO. pp. 77–107.

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SUMMARY

Sweden is a member of the European Union (EU) and so Swedish fisheries policy and management come under the umbrella of the Common Fisheries Policy (CFP) of the EU. The CFP regulates 'living aquatic resources' which is defined as available and accessible living marine aquatic species, including anadromous and catadromous species during their marine life. Further, when dealing with the exploitation of fishery resources, the CFP concerns only commercial activities. Consequently, the Member States have to manage all inland fishery and certain fisheries along the coastline, as well as non-commercial fishing activities in marine waters. Professional fisheries in Sweden include marine (offshore and inshore) and inland fisheries.

The management of Sweden's fishery and fisheries resources is primarily the responsibility of the Swedish Board of Fisheries, which operates within the framework and guidelines set by the Government and the European Union. The two other main management agencies involved are the Swedish Coast Guard and the County Administrative Boards. In addition, estimates on expenditure on scientific research outside the remit of these authorities have been included. Management services delivered by fishery participants are limited.

Total expenditure for Swedish fisheries management has been estimated at US$51.1 million, divided into sub-categories as follows:

• Scientific research	19.1 (37.3 percent)
• Policy development & operational management	7.9 (15.5 percent)
• Enforcement	17.1 (33.5 percent)
• Corporate and administrative support	7.0 (13.7 percent)

Expenditure is related not only to fisheries, but also to the value of maintaining fish stocks for biodiversity purposes. In addition, fisheries include fishing for both professional and recreational purposes, and fisheries management also includes the aquaculture and processing sectors.

Ninety percent (90 percent) of fisheries management expenditure included in this study is financed – directly or indirectly – by government funding. The level of funding for each authority is decided by the Parliament, and at the end of each year the relevant ministry issues a budget document for each of the authorities under its auspices. The ministries govern the authorities through a model of setting objectives as well as requirements for reportng on their fulfilment.

No funding stems directly from the industry. The Swedish Board of Fisheries has been authorized by the Government to apply a fee to cover the cost of handling application and permit issues. The Board has decided to charge a fee in very few matters, mainly relating to professional fishing licences. The Board of Fisheries is not, however, empowered to have the fees collected at their disposal. Moreover, the Board is empowered to charge for the monitoring of the Common Fisheries Policy, an authority which it has so far not utilized.

The effectiveness and efficiency of fisheries management expenditure is primarily evaluated by the relevant ministry, on the basis of the authorities' annual reports, and through Governmental Commissions of Inquiry, where specific areas are assessed from time to time.

1. INTRODUCTION

Sweden has a tradition of a privately-owned production sector and a very large public sector supplying public goods, services and infrastructure. From this it follows that fishing vessels are privately owned and run, but certain services and infrastructure (port facilities) are public. The aquaculture, processing, wholesale, export and service facilities are all privately owned, but thoroughly regulated to counteract externalities such as health hazards to consumers and employees, environmental degradation, tax evasion, etc. Structural changes are often aided by public subsidies, and education and other labour market services facilitate structural adjustment.

Sweden has been a member of the European Union since 1995 and so Swedish fisheries policy and management come under the umbrella of the Common Fisheries Policy (CFP) of the EU. The primary aim of the EU fisheries management policy is to ensure exploitation of living aquatic resources that provides sustainable economic, environmental and social conditions. To this end, the precautionary approach shall apply, i.e. in minimizing the impact of fishing activities on marine eco-systems. Management is primarily based on regulating the quantities of fish caught through a system of Total Allowable Catches (TACs), complemented by technical conservation measures. Effort restrictions are also being increasingly used within the framework of management and recovery plans.

The Common Fisheries Policy regulates ‘living aquatic resources’ which is defined as available and accessible living marine aquatic species, including anadromous and catadromous species during their marine life. Further, when dealing with the exploitation of fishery resources, the CFP concerns only commercial activities. Consequently, the Member States have to manage all inland fishery and certain fisheries along the coastline, as well as non-commercial fishing activities in marine waters. Most of the commercially important fisheries are regulated through quotas set by the EU.

The fishery sector (catching and processing) in Sweden plays a very small economic role in relative terms, and in 2003 the sector contributed by 0.2 per cent to the national Gross Domestic Product (GDP). However, the importance to some local economies is high. A few statistics on the country are given below.

Table 1: General data on the Kingdom of Sweden

Area	449 750 km^2
Shelf area (to 200 m)	165 295 km^2
Length of coastline	2 862 km
Population (2003)	9 million
GDP at producer price (2003)	US$300.8 billion

2. OVERVIEW OF KEY FISHERIES AND THE MANAGEMENT AGENCIES

2.1 Characteristics of the fisheries

2.1.1 Commercial fishery

Professional fisheries in Sweden include marine (offshore and inshore) and inland fisheries. Vessels used in marine, commercial fishing have to be issued with a vessel permit and at least one fisherman per vessel must hold a personal professional fishing license.

Although there is no formal definition of inshore and offshore fishing activities, the term small-scale fishing generally refers to those fishing activities where the vessel is out of port for less than 24 hours. At the end of 2004, the Swedish fishing fleet consisted of 1 608 vessels with a total GT of 45 000. More than half of these were inshore vessels using the above definition. Marine vessels under 5 metres in length and freshwater vessels do not have to be issued with a vessel permit.

The number of fishermen issued with a professional fishing licence amounted to 1 913 in 2004. Of these, 182 operated in fresh-water and 1 731 in marine waters, and a total of 17 were women. Those fishing in private waters do not need to hold a professional fishing licence.

The Swedish fishing fleet operates within an area stretching from the north-east Atlantic to the northern Gulf of Bothnia. Sweden also has a large number of inland waters, with around 90 000 lakes over 1 hectare, and 300 000 km of watercourses, providing significant potential for inland fisheries. Four major lakes in the south of Sweden account for the majority of the freshwater catch: lakes Vänern, Hjälmaren, Mälaren and Vättern.

Total marine professional catches in 2004 amounted to 269 000 tonnes in live weight. Expressed in landed weight, the total catch was 262 000 tonnes.[2] The value of these landings amounted to US$112.2 million[3].

The main fishing areas of the Swedish fleet are the Baltic Sea and the Kattegat/Skagerrak. In the table below, total catches are presented according to catch area as defined by the International Council for the Exploration of the Seas (ICES).

Table 2: Catches in 2004 according to ICES division

Area	ICES division	Catch	
		Tonnes, live weight	Percentage
Atlantic	IIa	24 504	9.1
North Sea	IVa, IVb	47 227	17.6
Skagerrak & Kattegatt	IIIa	49 941	18.6
Baltic Sea	IIIb, c & d	146 860	54.7
Total		268 532	

Of the total number of Swedish vessels with vessel permits, less than half had registered landings of more than US$10 640. In the table below, these vessels have been categorized according to their main fishery by value (more than 50 percent of their income).

Table 3: Vessels with registered catches over US$10 640 in 2004 classified by gear/target species

Vessel category	Vessel size (metres)	No.
Demersal trawlers	<24	74
Demersal trawlers	>24	13
Nephrops trawlers	<12	22
Nephrops trawlers s	>12	45
Passive gears, cod and salmon in the Baltic	>12	37
Pelagic trawlers, vendace in the Baltic	<24	22
Pelagic trawlerss, other species	<24	27
Pelagic trawlers	>24	55
Prawn trawlers		53
Passive gears, cod in the Baltic	<12	168
Passive gears , eel on the west coast	<12	42
Passive gears, eel in the Baltic	<12	47
Passive gears, other species on the west coast	<12	101
Passive gears, other species in the Baltic	<12	70
Passive gears, vendace in the Baltic	<12	14
Total		790

There are a large number of landing sites in Sweden. Several Danish harbours are also important for landing Swedish catches. The table below gives an indication of the geographical importance of the main coastal areas of Sweden. It should be stressed that a large proportion of the catch is landed directly in other jurisdictions, especially that catch which is intended for reduction to fishmeal and fish oil.

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[2] Figures categorized according to catch area are presented in live weight and according to landing area in landed weight.

[3] US$1.00 = 7.40524 SEK (mid-market rate as of 5 September 2005)

Table 4: Landings in 2004 by Swedish vessels, landed weight, tonnes

	For human consumption				For reduction	Total
Coastal district	Herring	Cod	Other fish	Crustaceans & molluscs		
West coast	20 556	1 098	6 554	3 250	24 893	56 351
South coast	10 412	11 472	3 554	1	6 255	31 694
East coast	3 506	1 265	9 450	0	9 558	23 779
Total Sweden	34 474	13 835	19 558	3 251	40 706	111 824
Abroad	19 350	462	10 309	13	120 313	150 447
Total	53 824	14 297	29 867	3 264	161 019	262 271

The most important species by value landed for consumption are by far cod and herring, which in 2004 accounted for almost 40 percent of the total value of marine landings. Another very important fishery is fish landed for reduction, mainly sprat, herring, sand eel and blue whiting, which accounted for 20 percent of sea fishery landings by value the same year.

The table below outlines Swedish marine landings by species. The first four columns show catches by catch area and the fifth column total catches, all recorded in live weight. The two columns to the right outline total landings, recorded in landed weight and the total value of landings.

As the purpose of the catch is not known until it has been landed, the first five columns show catches, regardless of its purpose. The two columns to the right, however, outline landings for consumption by species, and all fish landed for reduction as one item. Hence, the first columns show, for example, all sprat landed, while in the right-most columns, sprat for consumption is shown under “sprat” and sprat landed for reduction is included in “fish for reduction”. Likewise, prawns is shown as one post in the first columns, and separated into raw and cooked when landed.

Further, up until 1 January 2005, there was no obligation to draw up a sales note for volumes of less than 50 kilos; the equivalent limit is now 10 kilos. Thus, in 2004 catches landed and sold in lots of less than 50 kilos are not included in the table below. This explains why for certain species, for example trout, catches are considerably higher than recorded landings.

Table 5: Catches and landings in sea fisheries during 2004 - weight and value

Species	**Atlantic (tonnes)**	**North Sea (tonnes)**	**Skagerrak & Kattegatt (tonnes)**	**The Baltic & Öresund (tonnes)**	**Total tonnes (live weight)**	**Total tonnes (landed weight)**	**Total US ’000**
Eel	-	-	220	242	462	450	3 117.1
Salmon	-	-	3	675	678	431	1 344.5
Trout	-	-	1	32	33	8	22.4
Vendace	-	-	-	1 821	1 821	16	18.5
Whitefish	-	-	0	294	295	82	204.6
Other fresh-water fish	-	-	0	190	190	77	183.0
Halibut	-	0	6	0	6	6	80.9
Plaice	-	1	317	78	396	359	1 018.9
Witch	-	3	549	-	552	516	2 293.4
Dab	-	-	3	1	4	3	2.2
Lemon sole	-	3	29	2	33	29	133.0
Flounder	-	-	14	198	212	105	77.5
Sole	-	-	16	0	16	15	167.7
Brill	-	-	17	1	18	12	97.8
Turbot	-	0	7	26	33	25	151.1
Other flatfish	-	1	1	-	1	0	0.1
Cod	-	240	1 004	15 200	16 244	14 297	26 947.0
Haddock	-	187	158	0	345	298	585.0
Saithe	-	1 527	721	0	2 248	1 902	1 687.5
Pollack	-	16	34	1	51	45	131.5

Species	Atlantic (tonnes)	North Sea (tonnes)	Skagerrak & Kattegatt (tonnes)	The Baltic & Öresund (tonnes)	Total tonnes (live weight)	Total tonnes (landed weight)	Total US '000
Ling	-	3	34	0	37	34	84.7
Tusk	-	0	6	-	6	5	20.4
Norway pout	-	88	-	-	88	-	-
Blue whiting	16 517	585	2 856	-	19 957	-	-
Whiting	-	2	75	52	129	120	201.7
Hake	-	17	56	-	72	65	252.8
Other groundfish	-	3	6	-	9	-	-
Weever	-	-	8	-	8	7	20.5
Catfish	-	17	48	2	67	57	291.6
Sandeel	-	34 477	131	-	34 607	-	-
Gunard	-	3	2	0	5	2	1.8
Lumpfish	-	0	115	83	198	25	41.9
Monkfish	-	7	73	-	81	36	449.5
Garfish	-	-	46	2	47	5	5.4
Herring	7 986	5 692	31 431	43 922	89 031	53 833	15 901.2
Sprat	-	57	6 719	83 948	90 724	18 076	5 181.9
Mackerel	-	3 987	585	2	4 574	4 423	5 750.7
Porbeagle	-	5	0	-	5	-	-
Dogfish	-	0	244	-	244	241	510.0
Other marine fish	1	156	1 034	85	1 276	2 076	858.9
Fish for reduction						161 020	22 206.0
Liver						104	107.2
Roe						204	1 014.7
Crab	-	-	170	0	170	98	257.3
Lobster	-	-	31	-	31	14	532.9
Norway lobster	-	1	904	1	906	863	8 379.5
Prawns, raw	-	151	2 160	-	2 312	1 111	1 735.1
Prawns, cooked						1 175	10 099.5
Oysters	-	-	2	-	2	-	-
Blue mussels	-	-	101	-	101	-	-
Other crustaceans, shellfish & molluscs	-	0	6	-	6	5	9.5
TOTAL	**24 504**	**47 227**	**49 941**	**146 860**	**268 532**	**262 272**	**112 178.4**

Catches in inland waters by commercial fishermen amounted to 1 395 metric tonnes in 2004. The total value was US$6.6 million. The most important species by value are pike, crayfish and vendace, which in 2004 accounted for 70 percent of total landings. Vendace is fished primarily for its roe. Lake Vänern has the most important landing site. Statistics on the freshwater fishery is based on data from fishermen with a professional licence. The table below summarizes information on the professional inland fishery.

Table 6: Catches in inland waters by commercial fishermen (2004)

Species	Tonnes	US$ '000
Salmon	19	89.0
Trout	10	52.7
Char	12	93.3
Whitefish	106	359.3
Vendace	291	970.7
- of which vendace roe	18	926.4
Pike	123	254.3
Pikeperch	421	2 714.2
Perch	118	227.7
Eel	106	793.1
Crayfish	59	986.1
Other	128	67.4
Total	**1 395**	**6 607.8**

2.1.2 Recreational fishery

Recreational fishing is defined as subsistence fishing on the one hand and sport-fishing on the other. Following this definition, sport-fishing implies fishing with rod, hook and line for recreational purposes, and the catch is intended for use in the household. Subsistence fishing is normally carried out with multi-catch equipment, such as creels and nets, and the catch is primarily consumed within the household. Neither subsistence fishing nor sport-fishing (hand-gear) are included in the Swedish right of public access. However, sport-fishing is freely permitted along the marine coastline and in Sweden's five largest lakes – Vänern, Vättern, Mälaren, Hjälmaren and Storsjön. In other waters, sport-fishing is not allowed without a licence or some other form of authorisation. Foreign citizens have a right to sport-fishing to the same extent as Swedish citizens. Subsistence fishing with multi-catch equipment is permitted, to varying degrees, on the west coast, the south coast and along the northern parts of the east coast.

Traditionally, fisheries management in Sweden has focused on the commercial side, with less attention being directed to recreational fishing. Hence, less is known about recreational fishing and its impact on stocks. The figures below are collected form a postal survey, which is carried out every five years by Statistics Sweden[4]. The figures presented should, however, be regarded with great care considering the response rate which in this latest survey amounted to about 60 percent; a non-response survey shows that those responding were considerably more active in fishing for recreational purposes than the non-respondents, which will over-estimate all figures when extrapolating the results. The Swedish Board of Fisheries is developing methods for an elaborated collection of recreational data, such as catch, effort, costs and benefits. Bearing this in mind, the following figures can be presented from the survey.

- Of the about 6.4 million people aged between 16 to 74 living in Sweden, 1.7 million (28 percent) claim to have engaged in recreational fishing at least once in the year 2004. Of these, about 1.2 million are men and 0.6 million women and 80 percent of the total categorize themselves as sport-fishers, i.e. most recreational fishing takes place using hand-gear. The total number of days spent fishing[5] was estimated at almost 29 million.
- Total catch was estimated at 46 000 tonnes of which 62 percent was caught using hand-gear and 38 percent using multi-catch equipment (e.g. nets). Around 40 percent of the catch comes from fishing in marine, coastal areas with 10 percent from the five great lakes and about half of the catch from other lakes and rivers. Thus, the lion's share of recreational catches comes from fresh-water fishing. Catch-and-release fishing is not included in the above.

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[4] Fiske 2005 – en undersökning om svenskarnas fritidsfiske. Published on 22 June 2005 on the home pages of the National Board of Fisheries (www.fiskeriverket.se) and Statistics Sweden (www.scb.se) but not yet printed.

[5] A day spent fishing is defined as a day regardless of how many hours were dedicated to fishing

- The species most caught are perch, pike, herring, brown trout and mackerel. These species account for over half of total catches. Even if the figures above are assumed to be over-estimated, the statistics suggest that fishing is a very important recreational activity for Swedes.

2.1.3 Indigenous fishery

The Sami population in the northern parts of Sweden have special fishing rights within the reindeer husbandry areas. The right to fish is divided between the landowners – which include both private owners and the State - and the Sami villages. The division is not clear in that there are differing judicial views on the State's right to allow other than the Sami population to fish in certain areas. A Governmental Commission of Inquiry is currently working on this and will report on 1 December 2005.

Special rules apply for fishing on the State's water above the limit of cultivation and these rules do not form a part of the Fisheries Act[6], but is included in the Reindeer husbandry Act[7] and the ordinances following from that. These rules form the basis for the County Administrative Boards' (see below) mandate to manage fisheries in the areas concerned.

2.2 The management agencies

2.2.1 The Swedish Board of Fisheries

The management of Sweden's fisheries resources is mainly the responsibility of the Swedish Board of Fisheries (SBF), 'Fiskeriverket', which operates within the framework and guidelines set by the Government and the European Union (EU).

Since 1 January 1995, when Sweden joined the EU, its resource management policies have been harmonized with the Common Fisheries Policy (CFP). However, Sweden has sole responsibility for regulating freshwater fisheries and for certain fisheries along the Swedish coastline. Apart from resource management policy, the CFP comprises three key strands: structural policy; the common organization of the markets; and international relations. The EU also regulates the Member States' monitoring and enforcement activities.

The Swedish Board of Fisheries is responsible for all marine fishery. In this capacity, the authority issues regulations needed to implement Common Fisheries Policy, as well regulations on marine issues not covered by the CFP. Moreover, the SBF regulates freshwater fisheries in the four great lakes and in watercourses connected to the sea. In all other waters, the owner of the water has sole responsibility – water owners often join to set up fishery conservation areas within which they manage stocks and regulate access.

The Swedish Board of Fisheries was established in 1948 and falls under the auspices of the Ministry of Agriculture, Food and Consumer Affairs, and is headed by a Director General who also chairs the Management Board. Swedish government authorities are regulated through a Government Regulation[8] specifying the general mandate and tasks of authorities.

It is the responsibility of the General Director to economize on the State's financial resources and through cooperation with other agencies take advantage of gains to be made for the State as a whole. It is also the responsibility of the General Director to organize the authority in such a way that the management of financial and other resources, as well as the activities of the authority, are monitored in an adequate way. The Management Board shall, among other things, examine whether the operations of the authority are carried out effectively and are consistent with its purposes. The Management Board shall also decide on the authority's annual report and auditing plans. Within this framework, each authority decides on its own structure and organization.

Further, the relevant ministry issues a regulation for each authority specifying its particular objectives and responsibilities. The relevant regulation for the SBF[9] states that the Swedish Board of Fisheries is the central management authority for the conservation and use of fish resources. In line with its sectoral responsibility for the environment, the SBF shall act towards diverse and abundant fish stocks and an ecologically sustainable management of fish resources. In doing so, the Swedish Board of Fisheries shall, inter alia:

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[6] Fiskelag (1993:787)

[7] Rennäringslag (1971:437)

[8] Verksförordning (1995:1322)

[9] Förordning (1996:145) med instruktion för Fiskeriverket

- within the framework of the Common Fisheries Policy, assist in Sweden's endeavours to obtain an ecologically and financially sustainable fishery,
- contribute to a viable and environmentally adjusted food production for the benefit of the consumers,
- monitor, analyse and keep the Government informed on the status of fish stocks and the development within the fisheries sector,
- assist the Government and take part in international fishery issues and negotiations,
- contribute to creating conditions for ecologically sustainable and environmentally adjusted fishery and aquaculture sectors,
- contribute to increasing the possibilities for the public to fish,
- promote and undertake research within the field of fishery,
- assist in the implementation of the policy for regional development, and
- have the overall responsibility for fishery control.

Each year, the Ministry (in this case the Ministry of Agriculture, Food and Consumer Affairs), issues a budget document, where the specific objectives for that year are outlined. For each objective is specified on what the Ministry wants the authority to report. In addition, the Ministry instructs the authority to carry out a number of specific tasks, normally in the form of studies on certain topics. The role of the budget document is discussed further in the following sections.

The Swedish Board of Fisheries is organized in four departments:

- Research and Development Department
- Resource Management Department
- Fisheries Control Department
- Department of Administration

The Research and Development Department has three research units: the Institute of Marine Research based on the west coast, the Institute of Coastal Research on the Baltic coast, and the Institute of Freshwater Research, close to Stockholm. It also includes two Fisheries Research Stations, dealing with aquaculture (mainly for stocking purposes), and three Regional Fisheries Research Offices, which are primarily involved in investigations within the framework of the Environmental Code[10].

In addition to the Swedish Board of Fisheries, two other bodies are primarily involved in fisheries management: monitoring and enforcement activities are shared responsibilities with the Swedish Coast Guard and the 21 regional County Administrative Boards are engaged in a number of fishery issues.

2.2.2 The Swedish Coast Guard

The Swedish coastguard has long been a part of the Swedish Customs Service. In 1988, the Swedish Coast Guard was established as an independent authority, in order to reduce the sectoral division of State operations at sea. The Coast Guard is a civilian law enforcement authority under the auspices of the Ministry of Defence and its activities cover seven policy-areas; fisheries monitoring and control is included in two of these: Food policy and Judicial policy. According to the Government Regulation specifying the particular objectives and responsibilities of the Coast Guard[11], it shall co-ordinate all civil needs for monitoring and surveillance at sea.

The Swedish Coast Guard's tasks within fisheries cover both professional fishing in marine water and in two of the major lakes as well as recreational fishery in public marine waters and in some of the major lakes. The surveillance of professional fisheries takes place both at sea and in connection with landings in Swedish ports.

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[10] Miljöbalk (1998:808)

[11] Förordning (1988:256) med instruktion för Kustbevakningen

The Coast Guard consists of its Head Quarters, four Coast Guard regions and a flight division. Each region has its own regional management with a command centre, and each regional management is responsible for the operational activities in its area. The flight division's status is much like the Coast Guard regions, the difference being that the Flight Division operates along the entire coastline instead of in only one region.

The Coast Guard is led by a Director General. However, neither the Director General, nor anybody else at HQ, has any operational mandate or competence. HQ directs the Coast Guard regions by issuing policies, developing methodology, allocating budgets and monitoring the fulfilment of objectives set.

Apart from fisheries control, the Coast Guard performs customs controls, sea traffic surveillance, environment control, search and rescue, combats oil and chemical pollution, and carries out Police duties. Many of these activities vary in intensity according to the season and so the Coast Guard is involved in other areas of activity when fishing activities are less intense. It is also possible to work on several different policy areas simultaneously, which is an efficient way of using State funding.

As the Coast Guard has all these different duties, of which several can be performed at the same time, its principal, i.e. the Government, obtains a synergy effect that is estimated to be 300 percent.

2.2.3 The County Administrative Boards

Sweden is divided into 21 counties, each of which has a County Administrative Board and a County Governor. The County Administrative Board (CAB) is a Government agency under the auspices of the Ministry of Finance that represents the Government in the county.

According to the Government Regulation specifying the tasks and responsibilities of the County Administrative Boards[12], they shall coordinate different public interests from a Government perspective. In doing so, they shall ensure that national objectives and decisions have the best possible effect in the county, while taking regional conditions and circumstances into account.

Most of the tasks of the County Administrative Boards in the field of fisheries are specified in various Government Regulations or in the yearly budget document from the Ministry of Finance. They are involved in the national administration of issuing professional fishing licenses and the granting of EU-subsidies to the fisheries sector. Further, they issue permits to use fixed gear in public waters, to stock fish, and they decide on dispensations from technical regulations. Three northern county boards are involved in the administration of fishing on the State's water above the limit of cultivation. The CABs also have an important role as regards the aquaculture sector as a permit from this authority is needed in order to run a fish farm and also to transfer fish from one water-area to another.

In addition, the County Administrative Boards handle national grants for fishery conservation. They also decide on the establishment of, and keep a register over, fishery conservation areas. These involve member groups of private water owners who come together in order to promote tourism, co-operate on stock enhancement activities, and regulate access to their waters.

Some of the CABs deal almost exclusively with recreational fishery and aquaculture, as well as indigenous fishery. This is particularly true for the northern-most counties.

2.2.4 Other agencies

Other agencies engaged in fisheries management include the Swedish Customs Service, the Swedish Maritime Administration, the National Food Administration, the Swedish Board of Agriculture, and the Legal, Financial and Administrative Services Agency.

The Swedish Customs Service is responsible for the monitoring of imports of fish and fishery products from third countries, i.e. from outside the European Union. The Swedish Maritime Administration shall ensure that Swedish fishing vessels are measured and registered. The National Food Administration is involved in the monitoring of fish products intended for human consumption, e.g. for hygiene on-board fishing vessels, at fish landings and in connection with the import and transportation of fish. The Swedish Board of Agriculture's involvement in fishery issues includes inter alia fishing on the State's waters above the limit of cultivation, and animal feed. The Legal, Financial and Administrative Services Agency represents the public fishery interest in environmental court cases.

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[12] Förordning (2002:864) med länsstyrelseinstruktion

In addition, several universities undertake research in relation to the marine environment as a whole and also to fish and fisheries. The Swedish Environmental Protection Agency has the overall responsibility for environmental conservation and biodiversity issues and as such for non-commercial fish species. As far as enforcement, and more specifically, prosecution, is concerned, the Regional Public Prosecution Offices and the District Courts are involved. The County Administrative Courts handle administrative cases.

3. ALLOCATION OF FUNDS TO FISHERIES MANAGEMENT ACTIVITIES

3.1 Budget allocation process

3.1.1 The basis for allocating available funds

The Swedish Board of Fisheries is primarily financed with government funding. The level of funding is decided by the Parliament along with the funding for all other agencies, such as the Swedish Coast Guard and the County Administrative Boards, and at the end of each year the relevant ministry issues a budget document for each of the authorities under its auspices. The Ministries are governing the authorities through a model of setting objectives and requirements for reporting on their fulfilment.

The budget document for the Swedish Board of Fisheries is currently divided into three main areas: Research and development, Resource management and Fisheries control. Within each of these areas, specific objectives are outlined for the coming year, of which some are more long-term. The Ministry also defines how it wants the SBF to report on in what way the work of the authority has contributed to achieving the goals. In addition to the three main areas, objectives are set on more general issues, such as socio-economic analyses, equality between sexes, global development, regional considerations and public service. Each of these objectives also comes with specific requirements on how to report on their fulfilment.

Apart from the objectives outlined and the requirements for reporting, in the budget document the Ministry commissions the authority to undertake specific analyses on different subjects of special interest to the Government for the coming year.

For the last decade, the funding that comes with the budget document has been grouped under four appropriations: a general appropriation for the use of the SBF, one for the national co-funding of EU-grants to the fisheries sector, one which constitutes the EU-contribution towards these grants[13], and one appropriation for fishery conservation measures. Each of these appropriations is associated with certain conditions for its use. Some of these conditions take the form of specifying the minimum amount that should go towards a specific purpose, for example that no less than SEK “x” should be spent on a certain environmental objective.

On the basis of the budget document - its objectives and reporting requirements, the specific projects commissioned and the funding that comes with the document - the Swedish Board of Fisheries decides on how to best allocate the available funding to comply with these requirements.

The Coast Guard receives its budget document from the Ministry of Defence but the funding is rarely allocated between the different areas of activity or to a specified task. Yearly dialogues with the co-operating authorities, for example the Board of Fisheries or the Customs Service, lead to a general conclusion on what areas the Coast Guard should give high or low priority. Fisheries control is a common area of activity for which the Board of Fisheries and the Coast Guard are assigned different tasks.

3.1.2 Factors that determine the level of expenditure for a given fishery

On the basis of the budget document, other on-going long-term processes, planned activities within the framework of the European Union and activities funded by other than Government means (see section 6 below), the Swedish Board of Fisheries decides on how to allocate available resources. The budgeting process is an integral part of the SBF’s yearly planning process which results in a planning document finalized in December each year, where the work for the coming year is outlined along with an indication of what resources will be used for each area of work.

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[13] The Financial Instrument for Fisheries Guidance

The planning document (and indeed since a re-organization in 2003, the SBF) is structured in line with the budget document provided by the Ministry, i.e. the long-term objectives are based on the over-arching objectives set by the Ministry. These long-term objectives are broken down by the respective department into several more defined and operational objectives which in turn are translated into specific activities. None of these objectives however, and very few of the activities, are outlined by fishery. The division is instead by subject area, such as fleet capacity, the marketing regime, regional development, consumer affairs, the development of gear, the evolutionary effects of fishing, marine protected areas, environmental changes on the fish fauna, data collection, the prevention of the violation of regulations etc.

On the basis of the objectives defined by the SBF, and the outline of which activities are needed to fulfil the objectives, available resources are allocated, by sub-objective. The structure of the planning document is outlined in the figure below.

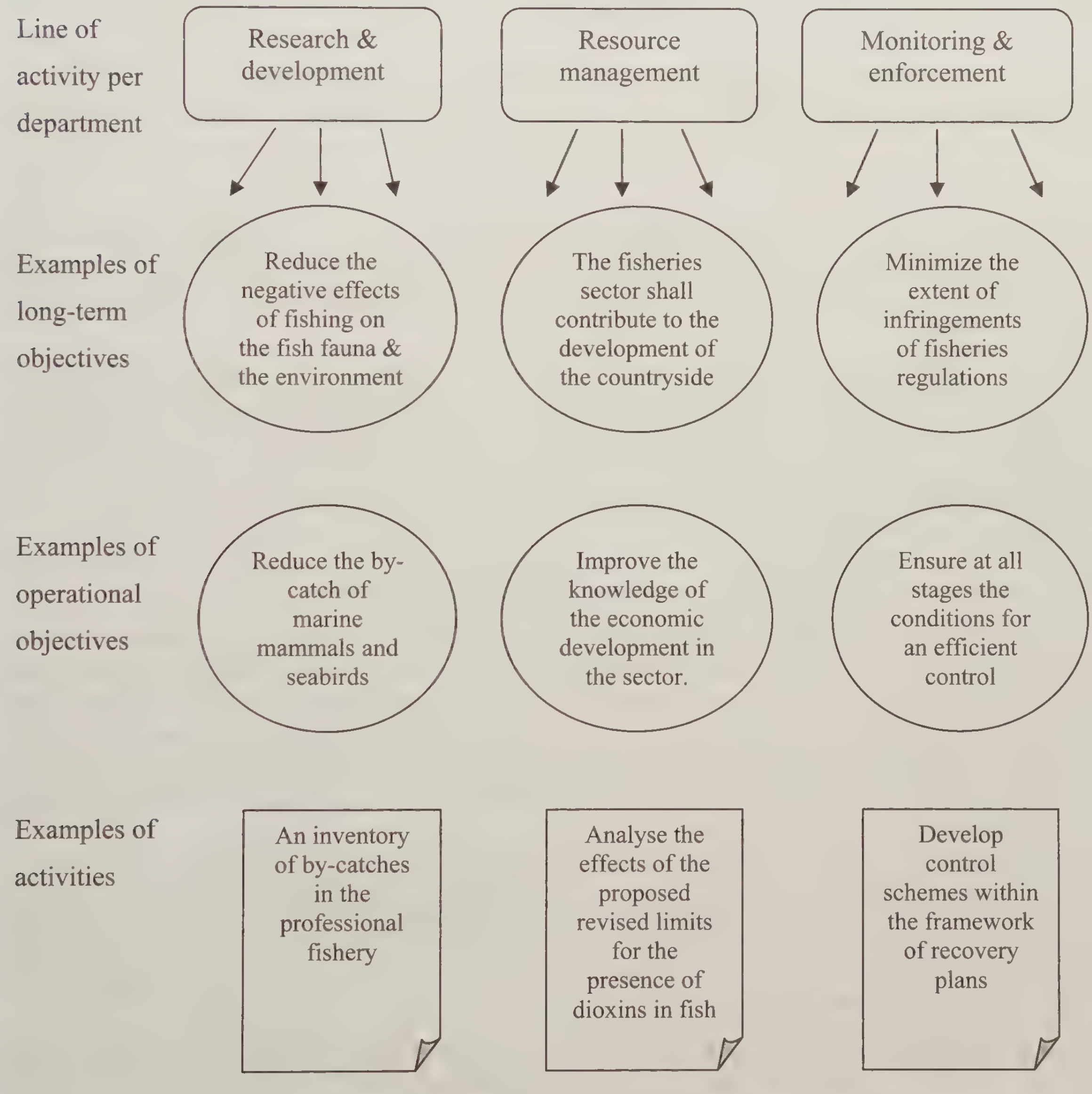
Line of activity per department
Research & development
Resource management
Monitoring & enforcement
Examples of long-term objectives
Reduce the negative effects of fishing on the fish fauna & the environment
The fisheries sector shall contribute to the development of the countryside
Minimize the extent of infringements of fisheries regulations
Examples of operational objectives
Reduce the by-catch of marine mammals and seabirds
Improve the knowledge of the economic development in the sector.
Ensure at all stages the conditions for an efficient control
Examples of activities
An inventory of by-catches in the professional fishery
Analyse the effects of the proposed revised limits for the presence of dioxins in fish
Develop control schemes within the framework of recovery plans

Figure 1: Structure of yearly planning document

The same structure applies for administrative objectives.

The budget is allocated at the level of operational objectives, based on the estimated time and other resources needed for each of the activities, and is decided by the General Director.

As mentioned earlier, the budget is allocated by area of work (operational objectives), rather than fishery. That said, the SBF has recently attempted to also estimate the level of expenditure, not by fishery but by geographical area, species, and purpose/recipient of activities. This has been done for the Research and

Development Department, which makes up 60 percent of the total budget of the SBF for 2005 and is discussed further in section 5.2.

3.1.3 The role played by individuals outside the fisheries management agency

Formally, on the basis of the budget document issued by the Ministry of Agriculture, Food and Consumer Affairs, the Swedish Board of Fisheries has the sole right to decide on how available resources should be allocated. However, there are factors that have an indirect impact on the planning process. The main ones are the SBF's dialogue with stakeholders, and its contacts with other authorities.

The Swedish Board of Fisheries co-operates extensively with stakeholders, primarily with the industry but also with environmental and other lobby organizations. Some of these contacts are formalized, others of a more ad hoc nature. The formalized networks include:

- advisory committees on resource management, aquaculture, processing and recreational fishery respectively,
- consultative groups with the catching sector on: structural issues (fleet structure, the issuing of professional fishing licenses, financial grants etc.), and technical and biological issues (the development of gear, areas closed to trawling etc.), as well as
- an expert panel on consumer issues.

There are also several local co-management projects ongoing, in which a wide range of interests are involved, and which the SBF co-ordinates. All of these contacts and what they bring forward as important issues to work on have a bearing on the priorities of activities and the budget allocation process of the Swedish Board of Fisheries.

The other main indirect influential factor is co-operation with other agencies. For example, the Swedish Board of Fisheries and the Swedish Coast Guard have elaborated a system for fisheries control at sea and in ports, based on risk analysis. In this process, co-ordination and adjustment of the authorities' routines for administrative as well as operational activities have been discussed, as well as the level and direction of the monitoring and surveillance. The outcome of course has an impact on how the SBF allocates its own resources.

3.1.4 Formal evaluations of expenditure and process for budget adjustments

As mentioned earlier, the Management Board decides on the annual report, including the financial report, before it is submitted to the Ministry. A formal evaluation of the annual report is undertaken by the Swedish National Audit Office. This, however, is concentrated on the reporting format, whether all information requested in the budget document is included, how well the financial information corresponds to the Ministry's budget document, routines for tracking all financial transactions, administrative routines in general and whether all information in the report can be verified. It does not generally evaluate whether or not the resources have been put to effective use.

A more in-depth evaluation as regards the use of means is included in the continuous dialogue on objectives and results between the Swedish Board of Fisheries and the Ministry of Agriculture Food and Consumer Affairs. The Ministry writes an evaluation report on the basis of the SBF's annual report. This report is then used in the dialogue in view of the annual report for the current year and the budget document for the coming year. This is discussed further in section 5.1.

In addition, the internal auditor may evaluate expenditure. The internal auditor establishes a risk analysis in view of each year and may or may not choose to include an evaluation of the annual report including expenditure.

As regards budget adjustments in the course of a year, after each four-month period, the Board of Fisheries itself evaluates its progress with each of the objectives laid down in the planning document as well as expenditure and income, and decides on any budget adjustments required. Decisions on the reallocation of resources within a department are taken by the head of this department, while decisions on reallocations between departments are made by the General Director. These decisions are documented.

4. SUMMARY OF EXPENDITURE

4.1 Categorization of expenditure

In addition to the Swedish Board of Fisheries, mainly two other authorities are involved in fisheries management as described in section 2: the Swedish Coast Guard and the regional County Administrative Boards. In addition to this, estimates on expenditure on scientific fisheries research outside the SBF have been made.

The general groups of expenditure as outlined in the headings below are very much consistent with the way the Swedish Board of Fisheries is organized with its departments for Research and Development, Resource Management, Fisheries Control, and Administrative issues. The total budget for the SBF for 2005 amounts to US$29.7 million. Some adjustments have been made from the Departments' budgets, however, to suit the categorisation of activities below. All figures for the Board of Fisheries below regarding Scientific Research, Policy Development as well as Enforcement are presented net of overhead costs, which are included in Corporate and Administrative Support.

Total expenditure for the Swedish Coast Guard amounted to US$86.8 m in 2004. Each authority is obliged to present its expenditure according to main areas of activity, and US$13.4 m was referred to as fisheries control in the Coast Guard's annual report. However, this is only one way of categorizing its expenditure. As the nature of its operations enables several tasks to be carried out at the same time, difficulties arise when time and costs shall be assigned to various areas of activity. An alternative method has therefore been elaborated in consultation with the National Audit Office, where time is registered several times when several areas of activity are being surveyed simultaneously. The number of hours is then used as weights when allocating actual costs as per its financial report to the various areas of activity.

An effect of using this method, however, is that if you take out an area of activity, the saving will not be proportionate to the cost shown, as a great share of the Coast Guard's costs are semi-fixed. Instead, time spent surveying would then simply have to be assigned to fewer areas of activity, and the same would apply for the costs for its vessels and aircraft etc.

A third way of calculating the costs for fisheries control, which has been developed for the purpose of a Governmental Commission of Inquiry (see section 5.1.2), is to only include time spent exclusively surveying fishing activities, thus excluding the basic costs for running a coastguard at all. However, the figure that will be used in the following is the official figure appearing in the annual report, i.e. US$13.4 m.

Total expenditure for the year 2003 for fishery and aquaculture related matters for all of the 21 County Administrative Boards was US$5.2 million. This figure includes both Scientific Research and Policy Development & Operational Management, as well as Enforcement, as shown below.

It should be borne in mind that expenditure on aquaculture is included in the budgets for both the Swedish Board of Fisheries and the County Administrative Boards. Aquaculture, however, is a relatively small sector in Sweden.

In addition to the above, research and development in relation to fish and fishery takes place at 14 universities, of which the main ones are Göteborg, Uppsala, Lund and Stockholm universities, as well as at the Swedish University of Agricultural Sciences.

4.1.1 Scientific research

Scientific research relating to fisheries management takes place mainly at the Swedish Board of Fisheries and at a number of universities. However, the County Administrative Boards are also engaged when it comes to stock enhancement.

As far as the Swedish Board of Fisheries is concerned, "Assessment" includes genetic studies and research on methods for analysing stocks. It also includes assessment within the framework of co-management projects, and so parts of this (US$0.51 m) could, alternatively, have been referred to the sub-category Consultation below. The category "Other" refers to various tasks carried out on behalf the Swedish Environmental Protection Agency. It is estimated that about US$2.7 million of the expenditure of the Board of Fisheries relates to applied research relating to fish and fishery.

The dominating financier of research relating to fish and fishery from which funding can be applied for, is The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, which annually allocates about US$2.7 million for both basic and applied research activities. It has not been possible to classify this funding according to sub-categories but the following areas are being prioritized when allocating grants: biodiversity, the dynamics and structure of fish stocks, sustainable management strategies, possibilities and risks related to aquaculture, fish diseases as well as the importance and development potential of fisheries.

It should be emphasized that the research activities funded by the Swedish Research Council include both fish and fishery as well as aquaculture, and so is not in its entirety related to fisheries management.

In addition, the universities have limited budgets of their own for the financing of research fellows and PhD students within the field of fish, fishery and aquaculture. This however, has not been included in the table below.

Table 7: Expenditure per sub-category for scientific research (US$ million)

Category / Authority	Assessment	Surveys & Data analysis	Stock enhancement	Fishery techniques & selective gear	Aquaculture	Other	Total
Swedish Board of Fisheries	4.91	5.72	1.15	0.76	2.06	0.61	15.20
County Admin. Boards	-	-	1.17	-	-	-	1.17
Swedish Research Council							2.70
Total							19.07

4.1.2 Policy development and operational management

Total estimated expenditure for Policy Development & Operational Management amounts to US$7.9 million, divided per sub-category as shown in the table below. The main authorities engaged in this area of activities are the Swedish Board of Fisheries and the County Administrative Boards.

"Consultation" includes advisory committees and consultative groups, co-management projects as well as other general contacts with and information to stakeholders and the public, including consumer issues. Consultation also includes advice to institutions in other countries within the framework of so-called "twinning projects" with EU candidate countries and new Member States, as well as other international development co-operation. Veterinary issues in relation to fish stocking has also been referred to this category.

"Preparing fishing plans" includes activities in relation to the setting of total allowable quotas, the elaboration of management and recovery plans, technical regulations etc. This category also includes socio-economic analyses and the elaboration of strategic plans for the fisheries sector.

"Licensing" includes the issuing of personal professional fishing licences and vessel permits, including licensing as a regional policy instrument and a means to reduce fishing capacity, as well as the issuing of special fishing permits for certain fisheries.

"Financial aid" includes the handling of structural aid from the EU structural fund the Financial Instrument for Fisheries Guidance and, to a smaller extent, national grants.

"Marketing regime" refers to work related to the EU organization of the common markets for fish and aquaculture products.

"Environmental code and water rights" mainly includes the work of the Swedish Board of Fisheries' three Regional Fisheries Research Offices: the handling of matters related to the Environmental Code, investigations on behalf of Environmental Courts as well as reviews of water rights' decrees on behalf of the Legal, Financial and Administrative Services Agency. The County Administrative Boards are also involved in these issues to a certain extent.

Table 8: Expenditure per sub-category for policy development & operational management (US$ million)

Category / Authority	Consultation	Preparing fishing plans	Licensing	Financial aid	Marketing regime	Environ-mental Code & Water Rights	Total
Swedish Board of Fisheries	1.65	1.46	0.57	0.80	010	1.87	6.45
County Admin. Boards	0.23	0.23	0.12	0.59	-	0.23	1.41
Total	1.89	1.70	0.68	1.39	0.10	2.10	7.86

4.1.2 Enforcement

Enforcement engages the Swedish Board of Fisheries, the Swedish Coast Guard and the County Administrative Boards. Bearing in mind what was said above about different ways of calculating the Coast Guard's expenditure on fisheries, total expenditure has been estimated to US$17.1 million, divided into sub-categories as outlined in the table below.

"Monitoring", "Control" and "Surveillance" have been interpreted according to the definitions used in the FAO Guide to monitoring, control and surveillance systems for coastal and offshore capture fisheries[14], i.e.:

- monitoring – the continuous requirement for the measurement of fishing effort characteristics and resource yields;
- control – the regulatory conditions under which the exploitation of the resource may be conducted; and
- surveillance – the degree and types of observations required to maintain compliance with the regulatory controls imposed on fishing activities.

For the National Board of Fisheries, monitoring activities relate to both fishing effort and quotas, including the collection and registration of data from logbooks, vessel-monitoring systems etc., as well as reporting and statistics. Control relates to ensuring the conditions for efficient enforcement, and surveillance refers to the follow-up of fisheries control regulations and measures taken against infringements.

The Fisheries Control Department within the Swedish Board of Fisheries handles not only resource control but also, to a certain extent, enforcement of the EU Marketing Regime and the EU structural aid (the Financial Instrument for Fisheries Guidance). These activities are included in the figures in the table below.

Table 9: Expenditure per sub-category for enforcement (US$ million)

Category / Authority	Monitoring	Control	Surveillance	Prosecutions	Total
Swedish Board of Fisheries	2.02	0.42	0.42	0.11	2.97
Swedish Coast Guard	-	-	13.44	-	13.44
County Admin. Boards	0.35	0.23	0.12	0.93	0.73
Total	2.37	0.65	13.98	0.14	17.14

As regards the involvement of the Regional Public Prosecution Offices and the District Courts as well as the County Administrative Courts, their expenditure is not specified for fishery-related matters. The only information obtained is the number of cases handled at the County Administrative Courts which (in 2004) amounted to 54: 42 referred to the Fisheries Act, two referred to the Fishery Conservation Areas Act[15]; and 10 referred to Government Regulations.

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[14] FAO Fisheries Technical Paper 415; ISSN 0429-9345

[15] Lag (1981:533) om fiskevårdsområden

4.1.3 Corporate and Administrative Support

Information about Corporate and Administrative Support is presented only for the National Board of Fisheries and the County Administrative Boards, as shown in the table below.

The item "Other" at the Swedish Board of Fisheries includes expenditure for its General Director and Management Board, rent for HQ premises, the personnel unit, registry etc. For the County Administrative Boards, all internal overhead costs have been referred to this column.

Table 10: Expenditure per sub-category for Corporate and Administrative Support (US$ million)

Category / Authority	Legal services	Education	Publicity	IT	Finances & Internal auditing	Other	Total
Swedish Board of Fisheries	0.09	Not specified	0.37	1.43	0.84	2.33	5.05
County Admin. Boards	0.34	0.04	0.09	Not specified	Not specified	1.49	1.96
Total	0.43	0.04	0.45	1.43	0.84	3.82	7.01

4.2 Approaches used to track expenditure

4.2.1 The Swedish Board of Fisheries

All of the SBF's expenditure is grouped into salaries, travel expenses, consultant fees, the purchase of material etc. as well overhead costs such as rent, depreciation and financial costs. All expenditure is also assigned to each of the units within a department and in parallel allocated to each of the main areas outlined in the Ministry's budget document.

Further, for the lion's share of the SBF's activities, the members of staff record how much time is devoted to each activity. Other costs, such as travel expenses, the use of material etc, are also assigned to the different activities. In this manner, a record is kept of how much each activity and, when aggregated, each operational objective costs.

The system of time logging is most developed within the Research and Development Department, which is explained by the fact that they have traditionally had several other sources of income than government funding (see section 6 below) and carry out projects on behalf of many different principals. Expenditure of the other three departments is not divided between the different activities to the same extent and not all members of staff assign their time between all the activities they are involved in. Therefore, for some of the operational objectives, information on their respective costs is still based on an estimate. A time-logging system for the whole of the SBF is, however, under way.

4.2.2 The Swedish Coast Guard

Similar to what has been described for the Board of Fisheries above, the Coast Guard's expenditure is grouped according to salaries, travel expenses, consultant fees, the purchase of material etc. as well overhead costs, which for 2004 amounted to 35 percent of the total budget. All expenditure is also assigned to each of the units within a department and allocated in parallel to each of the main areas outlined in the Ministry's budget document.

In contrast to the SBF, the Coast Guard does not follow up how much time is devoted to each activity on an individual basis. However, time for inspections is recorded as well as all units' patrol time directed towards monitoring and law enforcement in the various policy areas, for example fisheries.

4.2.3 The County Administrative Boards

The County Administrative Boards have a time-logging system whereby time is allocated to different tasks. As salaries is by far the most important cost for the CABs, time logging is the determining control mechanism. The cost (time) allocated to each task is checked against the current year's planning document.

5. ANALYSIS OF FINANCIAL INFORMATION AND PRESENTATION OF INDICATORS

5.1 Effectiveness and efficiency of expenditure on key management activities

5.1.1 Dialogue between Ministry and Authority

As explained in section 3, the Government monitors its authorities by: setting objectives for their operations; giving them specific projects each year; requiring that each authority reports on in what way their work has contributed to achieving the objectives; and to present the studies requested. The two main instruments are the yearly budget document for each authority and the authorities' annual reports.

In addition to this, as far as the National Board of Fisheries is concerned, the authority and the Ministry of Food, Agriculture and Consumer Affairs have a continuous dialogue on objectives and results throughout the year, as mentioned in section 3.1.4.

The Ministry writes an evaluation report in the spring, on the basis of the SBF's annual report which is presented in February each year. This report is used in the dialogue in view of the budget document for the coming year and the annual report for the current year. Items discussed in the report are inter alia the quality of the annual report, the financial follow-up, whether the operations are carried out efficiently, financial outcome as compared with budget, external reviews, assessment of results obtained and fulfilment of objectives set. However, no analysis in terms of value for money in relation to specific activities is carried out in this context.

In brief, the Ministry's evaluation report for the year 2004 presented the following findings:

- *Quality of annual-report*: All the information requested in the budget document for 2004 is included in the annual report. However, as the report is very descriptive in character, it is difficult to assess whether the SBF has fulfilled its obligations in relation to the objectives set.
- *Financial follow-up*: The SBF is to a large extent financed via external grants, which implies that the authority is financially vulnerable and to a high degree dependent on other authorities.
- *Efficiency of operations*: a lack of ratios results in difficulties to assess how efficient operations are carried out. However, low operating costs per employee, despite a geographically diverse operation, give an indication.
- *External reviews*: In 2004, the Ministry commissioned the National Financial Management Authority to assess the annual report of the Swedish Board of Fisheries. They conclude, among other things, that the SBF presents very well what has been done in order to achieve their objectives, but that not enough is said about whether this has in fact contributed to the fulfilment of the objectives.
- *Assessment of results and fulfilment of objectives*: A general view is that the reporting requirements outlined in the budget document are complied with. The Ministry also concludes, however, that there is not enough emphasis on analysing whether or not the results of the operations have contributed to the fulfilment of their objectives. Nor does the annual report contain an assessment of the results in relation to expenditure, that is expenditure per area of activity in relation to the objectives set.

The dialogue between the Ministry of Agriculture, Food and Consumer Affairs and the Swedish Board of Fisheries will continue in order to improve the annual report so that it better reflects the efficiency and effectiveness of the authority's operations.

5.1.2 Governmental Commissions of Inquiry

Apart from the Ministry's evaluation report, specific areas of the Swedish Board of Fisheries' activities are assessed from time to time through Governmental Commissions of Inquiry. In 2005, a Commission of Inquiry presented its evaluation of the Swedish fisheries control[16].

The report concludes that it was not possible to fully assess the effectiveness of the fisheries control activities, as not enough information on illegal fishing operations and their impact on fishery resources was available. Nevertheless, the Commission of Inquiry elaborated efficiency indicators for certain parts of the reported fishery and evaluated the efficiency of the authorities involved, primarily the Swedish Coast Guard and the Swedish Board of Fisheries, and, to a certain extent, the County Administrative Boards. Its main findings touched upon the division of labour between authorities; co-operation and co-ordination between authorities; Government monitoring and follow-up, and plausible efficiency gains.

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[16] Den svenska fiskerikontrollen – en utvärdering. SOU 2005:27. ISBN 91-38-22331-7

Division of Labour: The Inquiry found that the division of labour for fisheries control activities between different authorities is not well enough specified and proposes certain changes in order to remedy this and also to simplify the monitoring and follow-up of the authorities involved.

Co-operation and co-ordination: The Inquiry identified a need for further developing the co-operation and co-ordination between the parties involved – authorities, the fisheries sector and the Chancery, and also an extended exchange of experiences between the authorities involved in fisheries control on the one hand, and the judicial system on the other.

A more effective fisheries control: The Inquiry proposes that the objectives in the authorities' budget documents be more effect-orientated and also that the Board of Fisheries and the Coast Guard are given the task of jointly elaborating a system of indicators for measuring and following illegal fishing activities. The Inquiry also requests a process-flow mapping and analysis.

Efficiency gains: The Inquiry is of the view that there is scope for trying internal monitoring systems for fish quality control, in order to save resources. The Inquiry also suggests certain changes in the direction towards an intensified control of the distribution and processing parts of the production chain.

5.1.3 Independent evaluations

Certain areas of activity, primarily those governed by EU regulations, require independent evaluations. One such area is the Financial Instrument for Fisheries Guidance: the EU financial grants. All EU Structural Funds are administered within multi-annual programmes; the current ones run from 2000 – 2006 and three programmes involve the Swedish fisheries sector.

According to Council Regulation (EC) No. 1260/1999 laying down general provisions on the Structural Funds, various evaluations shall be undertaken. For example, a mid-term evaluation shall examine, in the light of the ex-ante evaluation, the initial results of the assistance, their relevance and the extent to which the targets in the programmes have been attained. It shall also assess the use made of financial resources and the operations of monitoring and implementation. An independent mid-term evaluation was carried out on behalf of the Swedish Board of Fisheries during 2003[17].

The evaluation primarily attempts to assess the impact of the financial grants paid to the final beneficiaries and the relevance of the programmes' objectives, and not how well resources within the Swedish Board of Fisheries and the County Administrative Boards have been used to administer the grants. The evaluation does assess whether the programming organization was deemed functional, and whether enough staff had been assigned to these tasks for a grant application to be processed within a relevant period of time and so to ensure that the administrative conditions are in place to enable the objectives of the programmes to be achieved; this did not, however, include an analysis of whether the programme administration was efficient.

5.2 Findings on expenditure ratios, etc.

As mentioned earlier, the budget of the Research and Development Department of the Swedish Board of Fisheries accounts for 60 percent of the authority's total budget for 2005. This is also the Department where the most efforts have been made to classify expenditure by, for example, geographical area, species, and purpose/recipient of information.

The Department includes the Institute of Marine Research, the Institute of Coastal Research and the Institute of Freshwater Research as well as two Fisheries Research Stations, dealing with aquaculture (mainly for stocking purposes), and three Regional Fisheries Research Offices, which, as mentioned earlier, are involved mainly in investigations within the framework of the Environmental Code. The Department's budgeted resource use for 2005 is shown by type of water in Table 11.

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[17] Gemenskapens strukturåtgärder inom fiskerisektorn 2000-2006 – halvtidsutvärdering. Inregia AB.

Table 11 Expenditure classified by type of water (2005)

Water	Share
Marine	28.7%
Coastal	21.6%
Inland	25.5%
All types	24.2%

About half of the Department's budget is specified per species. From this information, the relative importance in terms of budgeted spending for 2005 and the value of landings from the professional as well as the recreational fishery has been calculated as shown in the figure below.

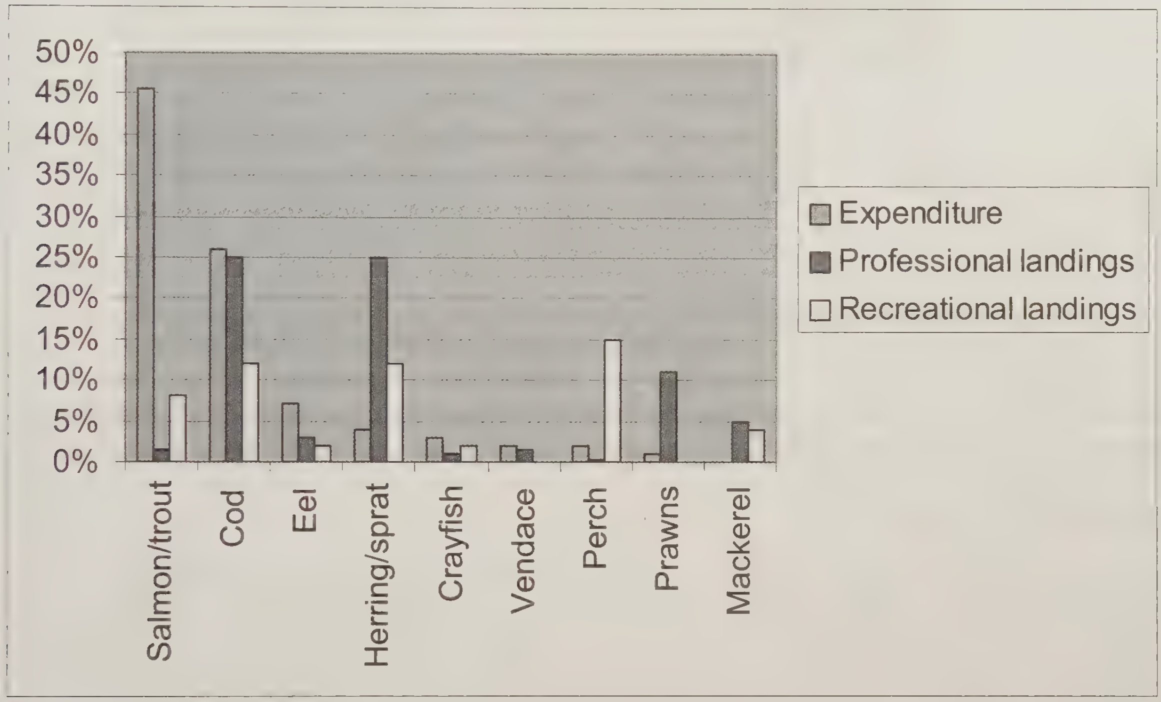

Figure 2: Relative importance of selected species

Value of professional marine/coastal landings is based on logbooks for 2004 and of professional inland landings for 2002; value of recreational landings is based on estimates from 2000.

When studying the diagram, it becomes apparent that expenditure on research activities often does not correlate with their relative importance in terms of landings. While this may indeed reflect a skewed prioritisation, it should be borne in mind that some species may motivate greater expenditure for biodiversity/environmental reasons than is indicated by landings. Similarly, a stock in good health may not need as much attention as its relative importance for the fishery would indicate.

As regards salmon/trout, salmonids have always attracted the interest of fish biologists, and are often used as model species for general ecological issues. As regards Sweden, there are two additional reasons for its great share of the SBF:s expenditure. Firstly, several Swedish rivers have been exploited for hydropower, which has had a significant impact on fish stocks and water areas. As a consequence, the hydropower companies have, in water rights' decrees, been charged to set aside a certain amount of money each year for compensatory measures. Some of this money is under the disposition of the Swedish Board of Fisheries and as it is mainly a question of salmon/trout in these rivers, the money has to be used for stock enhancement measures for these species. Secondly, salmon and trout used to play a greater role for the Swedish professional fishery, before salmon was farmed in large quantities, and so there is an element of tradition involved.

The figure below is an attempt to categorize the Department's expenditure according to its purpose or the information's recipient.

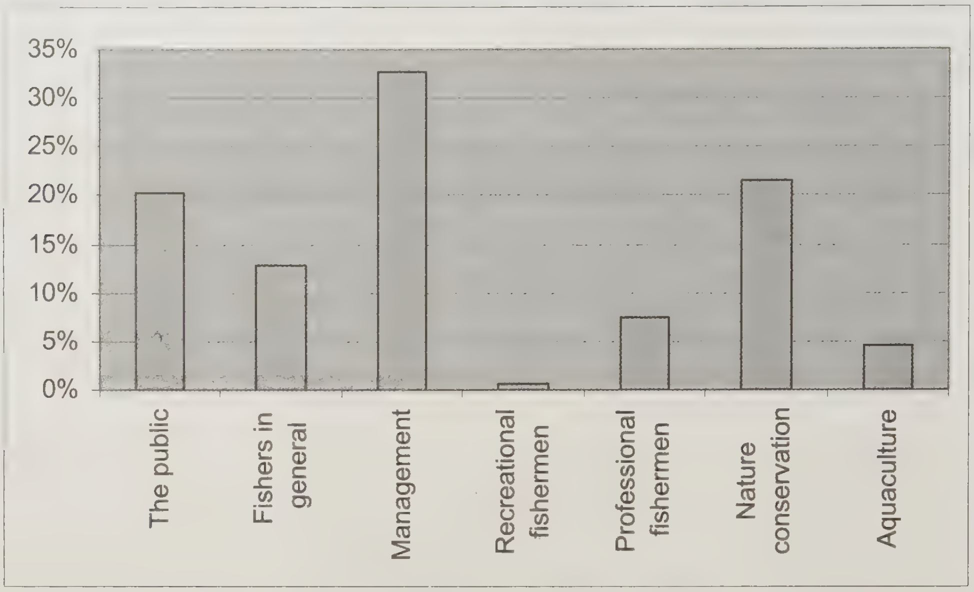

Figure 3: Share of budgeted expenditure for 2005 per primary target group

As is shown by the figure, the primary target of the work of the Research and Development Department is management, i.e. advice for management decisions.

6. SOURCES OF FUNDING

6.1 Level of government and non-government funding for fisheries management activities

The lion's share of fisheries management in Sweden is financed via the Government; this is valid for the Swedish Board of Fisheries as well as the Swedish Coast Guard and the County Administrative Boards and the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning.

Although the categories of expenditure outlined in section 4 do not wholly correspond with the departmental division within the Swedish Board of Fisheries, sources of funding is presented by department in the table below.

The Swedish Coast Guard is financed via Government appropriations almost in its entirety – the remaining share as far as fisheries control is concerned being EU-funding.

The County Administrative Boards are almost exclusively (99 percent) financed via Government funding. A minor share is made up of a number of fees that the County Administrative Boards have at their disposal. None of these, however, is related to fishing.

The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning has Government funding only.

The table below outlines the different sources of funding in more detail.

Table 12 Type of funding (US$ million)

Authority Type of funding	Swedish Board of Fisheries				Swedish Coast Guard	County Admin Boards	Swedish Research Council	Total
	R & D Dept.	Resource Management Dept.	Fisheries Control Dept.	Dept of Adm. & other corp. services				
Direct Government funding	8.64	3.02	2.63	4.84	13.35	5.27	2.70	40.45
EU	1.70	0.11	0.56	0.11	0.09	-	-	2.57
In-direct Government funding	2.42	0.67	-	0.05	-	-	-	3.13
Hydropower compensatory funding	3.37	0.01	-	0.09	-	-	-	3.46
Companies etc.	1.36	-	-	-	-	-	-	3.36
Other	0.11	-	-	-		-	-	0.11
Total	17.60	3.81	3.19	5.09	13.44	5.27	2.70	51.08

As far as the Swedish Board of Fisheries is concerned, direct Government appropriations are allocated through the yearly budget document. Indirect Government funding is means that the authority receives from other authorities in return for work commissioned; the Resource Management Department, for example, receives funding from the Swedish International Development Cooperation Agency, and the Research and Development Department carries out work on behalf of the Swedish Environmental Protection Agency.

EU-funding includes money for the collection of biological as well as economic data, and for development projects for the monitoring and control of fisheries. EU-funding is also made up of structural grants from the Financial Instrument for Fisheries Guidance (FIFG) in order to undertake studies, pilot projects and training measures, as well as expenditure for the preparation, implementation, monitoring and evaluation of the structural programmes. The bulk of the EU funding goes towards the collection of biological data within the Research and Development Department, and towards studies and pilot projects financed via the FIFG, within the same department.

As mentioned in section 5.2, several Swedish rivers have been exploited for hydropower and the hydropower companies are obliged to finance compensatory measures. About half of the funding allocated to the Swedish Board of Fisheries is directed towards measures in specific rivers, such as stock enhancement and the building of salmon ladders. The other half is used for general research on the effects of exploiting rivers for hydro-power purposes.

Funding from companies refers to specific tasks assigned to the SBF by individual companies or consortiums. These tasks concern, for example, studies on the effects on commercial fish stocks relating to nuclear power stations, the building of a bridge, the laying of a cable at sea etc.

As the table shows, the most important source of funding, by far, is central Government; if including direct and indirect Government funding as well as EU-funding, the share is 90 percent. The fishing industry does not pay any levies or other specific fees for the management of commercial fishery or fish stocks. The only fee that each fisherman has to pay directly, is a fee of US$68 when applying for a personal, professional fishing license for the first time. This amount is reduced to US$40 when applying for the renewal of a license, as these are issued for a maximum of five years. This money, however, is not marked for the financing of fisheries management, but goes into the general treasury.

6.2 The use of non-government funds

As mentioned above, no funding for fisheries management stems directly from the industry. The only private funds involved, are the specific appropriations stemming from the exploitation of rivers for hydropower purposes, the use of which is strictly regulated, and funding from individual companies or consortiums. The latter is regulated in contracts for each specific task.

6.3 Cost recovery mechanisms

The Swedish Board of Fisheries has been authorized by the Government, which in turn has been authorized by the Parliament, to apply a fee to cover the cost of handling application and permit issues, such as applications for professional fishing licences, vessel permits, special, permits for specific fisheries (for example in third country waters), permits to run a fish farm or to move or stock fish. Moreover, the SBF is empowered to charge for the monitoring of the Common Fisheries Policy. However, the Board of Fisheries has decided to charge a fee only in matters relating to professional fishing licences, permits to use fixed gears in public waters – which are handled by the County Administrative Boards – and for the control of common marketing standards when third country vessels land fish in Swedish ports during certain hours.

The Board of Fisheries is not, however, empowered to have the fees collected at their disposal. Instead, as mentioned above, this money goes into the general treasury.

6.4 Issues associated with ability to pay

As already mentioned, there are currently very few cost recovery mechanisms within Swedish fisheries management. As the management systems become all the more complicated, however, a discussion has started to emerge as to whether it may be reasonable for vessel owners to pay for some of the services carried out by government institutions. This relates primarily to various kinds of fishing permits, for example to fish in certain areas or for certain species. To apply for, and receive, all of these permits, is presently a free service provided by the Swedish Board of Fisheries or the County Administrative Board. A potential fee would, at least initially, probably not be set so as to cover the authorities' actual expenditure, but would be symbolic and possibly contribute to reducing the number of applications submitted per vessel.

A more radical discussion, which has not yet fully evolved in Sweden, concerns the introduction of some form of resource rent, i.e. to absorb supernormal profits deriving from the exploitation of fish resources. The resource rent currently rests with the fishing sector in Sweden, as the fish is a free resource within the framework of quotas, rations and other effort systems, and no levy upon landing or other purpose-built tax is in place.

Assessing the level of any supernormal profits is a difficult issue, especially as they vary over time. In order to take into account the fact that profitability varies, the management authority could assess and collect the resource rent by auctioning the most important species – pelagics, for example – in view of each fishing year. In this way, the management authority, i.e. the Swedish Board of Fisheries, would still control the fish resource, as opposed to a system of Individual Transferable Quotas (ITQs) whereby quotas or effort are sold or in any other way handed out once and for all. In a system with ITQs, the resource rent stays within the sector and is manifested in the price of quota when transferred.

Collecting at least parts of the resource rent may in fact be favourable even for the catching sector in the long term. Sweden has traditionally experienced problems as a result of the fleet having been too profitable in times when stocks and/or prices have been advantageous, in that the management authorities have not been able to resist pressure to expand the fleet. The current administrative tools in the form of licenses and vessel permits have proven not to be sufficient when profits are there to be collected and indeed, there has even been political pressure to increase the number of fishermen. An economic tool, to collect the resource rent and thus to keep companies' profits down, might have helped to avoid the current overcapacity within the fleet.

Overcapacity is currently particularly apparent within the Swedish pelagic fleet, which depends on large quantities of fish and is very sensitive to price fluctuations. As both stocks and prices vary substantially within short cycles, this is a segment where supernormal profits are accumulating quickly. One way of measuring these historically, is to look at investment.

A system of tax deductions for investments is applied in Sweden; the reason behind this is that society wants to stimulate economic growth. However, this may be counterproductive when applied to activities based on common resources, such as fisheries. As tax pressure is relatively high in Sweden, companies are eager to re-invest their profits and so avoid paying tax. The abolition of tax on re-invested profits is a form of stimuli, or subsidy, which encourages investment and so the capitalisation of the fleet. In addition, since joining the

European Union in 1995, Sweden has subsidized investments directly through EU structural support schemes (the Financial Instrument for Fisheries Guidance).

A study has been undertaken which looks specifically into the development of a Swedish pelagic segment in the context of EU structural support schemes for the period 1995 – 2002[18]. By analysing the level of investment, the general development within the segment, the possible impact of subsidies on the volume of investments and in turn on catches, profitability, fishing capacity and fishing effort, an attempt to assess the resource rent can be made. Subsidies in various forms tend to capitalize any resource rent, thus contributing to overcapacity and fuelling a development of inefficiency. Investment as a result of supernatural profits should be not encouraged but discouraged, in order to reduce the risk of an overcapitalized fleet.

7. FISHERIES MANAGEMENT SERVICE PROVIDERS

7.1 Types and levels of services provided by non-government sources

No non-government service providers are formally involved in Swedish fisheries management and, as mentioned in section 6, there is no non-government funding involved in fisheries management in a strict sense. However, there are non-government parties who are actively involved in an advisory capacity. One example is the advisory and consultative groups under the auspices of the Swedish Board of Fisheries where, for example, the World Wildlife Fund, the National Processing Federation and the Swedish Fishermen's Federation, are represented, and where various fisheries management issues are discussed and debated, such as areas closed to trawling, national management plans, the structure of the Swedish fishing fleet etc.

Apart from the various federations (processing, catching sector, aquaculture etc.) and other individual non-governmental organizations, in 2003, a Fisheries Secretariat was set up jointly by three NGOs: the Swedish Society for Nature Conservation, WWF Sweden and the Swedish Anglers' Association. The Fisheries Secretariat works towards more sustainable fisheries through information, international co-operation, and lobbying at the international level, but focussing mainly on the European Union. The Secretariat is, however, the result of Government funding.

Further, as outlined in section 3.1.3, there are several local co-management projects ongoing. These are the result of a Governmental Bill on small-scale coastal and freshwater fishing (and aquaculture)[19], whereby the Government instructed the Swedish Board of Fisheries to co-ordinate at least five local fisheries management initiatives. Six initiatives have developed during 2005 and the SBF is to report on their function and results before the end of 2006. The role of these projects, and its participants, vary, but they all include a broad range of stakeholders and deal with various issues related to professional as well as recreational fisheries, and are to take other water-users as well as environmental interests into account. If successful, they may prove a way forward in other areas in order to increase the involvement in, and legitimacy for, fisheries management decisions.

7.2 Management services delivered by fishery participants

Two examples can be found whereby the catching sector itself delivers management services, a voluntary rationing system, run by the Fishermen's Federation, and the work of Producer Organisations.

7.2.1 Voluntary Rationing System

The Swedish Fishermen's Federation operates a rationing system for certain commercially important species. These include saithe, haddock, whiting, plaice, sole and cod in western waters. The Federation has various committees under its auspices, which, where applicable, decide on the size of the ration per week or month; the ration is altered throughout the year according to fishing patterns and how much quota remains. The number of rations per vessel depends on a combination of vessel length and tonnage. A specific system is in place for northern prawn, for which, in addition to a rationing system, fishing is only allowed three days per week.

The Swedish Fishermen's Federation also used to regulate fishing for pelagic species. However, as the economic conditions for these fisheries hardened due inter alia to lower prices, some members either dropped out of the federation or started to ignore these voluntary systems. As a consequence, the Federation asked that the Swedish Board of Fisheries formally regulate the rationing systems for these species, which it has done since 2001. For the single most important fishery in Sweden, cod in the Baltic, the Swedish Board of Fisheries has had a rationing system in place since the mid-nineties, and since 2002 the SBF allocates certain fisheries per vessel.

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[18] Johannesson J. and Gustavsson T. (2004) *The Development of a Swedish Pelagic Segment in the context of EU Structural Support Schemes 1995 – 2002*, National Board of Fisheries, Sweden.

[19] Regeringens proposition 2003/04:51 Kust- och insjöfiske samt vattenbruk

7.2.2 Producer Organisations

The European Union operates a common organization of the markets in fishery and aquaculture products, whereby market stability is encouraged. Amongst other regulations, a system of withdrawal prices is operated for the most important commercial species. A necessary condition is that the fishermen themselves establish producer organizations which, within the framework set up by the Union, administer this system.

Each year, the EU establishes central withdrawal prices for each of these species, on the basis of sales prices the previous years. The Producer Organisation establishes a minimum price for its members, which can deviate to a certain extent from the central price. If the price at, for example, an auction does not reach the minimum price, the Producer Organisation (PO) buys out the fish and pays a withdrawal price to the fisherman. The fish bought by the PO must be destroyed.

The compensation from the EU to the Producer Organisation decreases as the volume withdrawn increases, but on average pays about 90 percent of the withdrawal prices paid to the fishermen. The remaining share, and some of the administration costs, must be paid for by the PO members themselves, and is covered by a fee upon landings.

Further, at the beginning of the fishing year, each Producer Organisation shall draw up an operational programme, including inter alia a marketing strategy to be followed by the organization to match the quantity and quality of supply to market requirements. Again, the European Union pays the PO:s for establishing these programmes.

Sweden has four POs, covering different areas and species, of which one is nationwide.

8. CHANGES IN EXPENDITURE FOR FISHERIES MANAGEMENT

The following discussion will primarily relate to the main fisheries management agency, the Swedish Board of Fisheries. It has not been possible, however, to categorize expenditure over time. The categorisation made in section 4 for the year 2005 was based on information per management objective as outlined in the yearly planning document. Categorisation per objective is not possible for previous years as the planning documents were not sufficiently detailed. Neither has it been possible to obtain a comparable categorisation per department, as the Swedish Board of Fisheries has undergone several reorganizations within the last ten years. The roughest division would have been to use the main areas of activity, as outlined in the budget document from the Ministry, but their disposition have varied considerably over time and they are therefore not at all comparable. Instead, total expenditure for the Swedish Board of Fisheries in selected years is shown in the table below and commented on in the following paragraphs.

Table 13: Total expenditure of the Swedish Board of Fisheries

Year	1993/94[20]	1998	2000	2002	2004	2005 (budgeted)
US$ million	23.1	24.8	22.2	23.4	30.2	29.7

In 1993/94, more than 30 percent of the expenditure of the Swedish Board of Fisheries referred to international development co-operation. The SBF had an extensive consultative operation, mainly financed by the Swedish International Development Cooperation Agency. However, the lion's share of expenditure referred to direct project aid. European co-operation was limited as Sweden had not yet joined the European Union and amounted to only 3 percent of total expenditure. The remainder was referred to stock enhancement and other measures to secure healthy fish stocks in Swedish waters (58 percent), and responsible use of these resources (7 percent).

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[20] The budget year previously run from 1 July – 30 June.

In 1995, Sweden joined the European Union and considerable resources were devoted to adjusting the Swedish management system to suit the framework of the Common Fisheries Policy (CFP). Requirements increased considerably in the area of fisheries control, and in 1997, a specific department for fisheries control was established. In addition, the level of investment aid and other grants to the fisheries sector – and expenditure for administering these - increased substantially as a consequence of access to the Structural Funds.

After a Governmental Commission of Inquiry on fisheries administration from an EU-perspective[21], the Board of Fisheries reorganized further, and a department for marine (CFP) issues, and one for coastal and freshwater (national) issues were established, so as to better suit the delimitation of the CFP. In 1998, the Swedish Board of Fisheries was given sectoral responsibility for the environment, implying that it had specific environmental responsibilities within the fisheries sector.

Total expenditure in 1998 amounted to US$24.8 million, a modest increase compared to 1993/94, considering all new tasks that had followed from EU-membership. However, the level of international development co-operation had been more than halved in absolute terms and only accounted for 13 percent of expenditure in 1998. The other main categories of expenditure in 1998 were Fisheries sector, 10 percent; Recreational fisheries, less than 1 percent; Fish resources, 72 percent, and Promotion of fish, 4 percent. The promotion of fish was a task that the SBF was temporarily assigned by the Government and given specific resources for, as a levy-/withdrawal system run by the industry which had previously financed these activities, had been deemed incompatible with the EEA Agreement[22] signed in 1992.

In 1999, 15 environmental quality objectives were adopted by Parliament. They define the state of environment which environmental policy aims to achieve, and provide a coherent framework for environmental programmes and initiatives at national, regional and local level. This was about to give the Swedish Board of Fisheries' sectoral responsibility for the environment another dimension.

Total expenditure for the year 2000 amounted to US$22.2 m. The reduction as compared with 1998 was mainly due to the winding up of the Board's responsibility for the promotion of fish, again taken over by the industry, and a further reduction in the field of international development co-operation.

At the end of 2001, the Board was given considerable resources in order to work with the environmental quality objectives. The authority's involvement lies principally with the following two of the 15 objectives:

- A Balanced Marine Environment & Flourishing Coastal Areas and Archipelagos
- Flourishing Lakes and Streams

Careful planning and the employment of staff took considerable time and so not all the funding assigned for one year for this purpose was used. Total expenditure for 2002 amounted to US$23.4 million, of which 90 percent was used under the heading fishing resources and 10 percent for the development of the fishery sector. Work with the environmental objectives developed further over the coming two years and in 2004 expenditure amounted to US$30.2 m, of which 91 percent was devoted to fishing resources, where practically all of the environmental funding was used, and 9 percent to the development of the sector.

The most important drivers by far behind changes in the magnitude and composition of expenditure, are Sweden's membership of the European Union and the adoption of the environmental quality objectives. EU membership has particularly increased expenditure devoted to monitoring and enforcement, the collection of data - both biological and economic – as well as the granting of financial aid to the fishery sector. It may be worth pointing out that the structural funding that the SBF manages for the fisheries sector – which includes both EU and national funding – is not a part of the Board's expenditure as outlined above, other than if the Board itself receives funding for specific projects.

The Swedish Coast Guard has only recently started to present its expenditure by area of activity and so the equivalent comparison over time for one area of activity, fisheries, has not been feasible within the timeframe of this study.

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[21] Fiskeriadministrationen i ett EU-perspektiv – Översyn av fiskeriadministrationen m.m. SOU 1998:24. ISBN 91-38-20841-5.

[22] European Economic Area - creating a Single Market covering not only the European Community but also the countries of the European Free Trade Area (EFTA).

As far as the County Administrative Boards are concerned, no critical changes in expenditure have occurred over the last 10 years; salaries is the by far the most important cost and the number of staff is basically unchanged.

9. ACTIONS THAT HAVE IMPROVED THE CAPABILITY TO MEET FISHERIES MANAGEMENT OBJECTIVES

As was pointed out in section 8, EU-membership and the environmental quality objectives are the two factors that have influenced the Swedish Board of Fisheries, and overall fisheries management, the most over the last decade. A few other recent factors that have played an important part in improving the conditions for good governance are outlined below.

A commitment to an ecosystem approach to management

Sweden shall adopt the ecosystem approach in fisheries management as defined in the Rio declaration. This is also an ongoing process within the Common Fisheries Policy and within the framework of the International Council for the Exploration of the Seas.

The ecosystem approach is expected to help achieve fisheries management objectives, for example through the use of marine protected areas as a management tool, a shift to fleet-based assessment of fishing mortality (replacing single-stock assessment), and a transition towards effort regulation replacing, or as a complement to, quotas.

Additional members within the European Union

As fisheries policy is a common policy within the European Union, the entry of new Member States means that larger water areas come under EU management. In 2004, the Baltic States and Poland joined the European Union, which meant that the Baltic Sea practically became an EU-water; in principle only a small enclave of Russia (Kaliningrad) which borders to the Baltic Sea remains outwith EU jurisdiction.

The EU has withdrawn from the regional fisheries management organization for the Baltic Sea (The International Baltic Sea Fisheries Commission) and will instead establish a bilateral agreement with Russia. The fact that practically the whole of the Baltic Sea is now under the jurisdiction of the European Union, means that fishery operations come under one regulatory umbrella, of which management and recovery plans including common rules for monitoring and enforcement plays an important part.

The development of new management regimes

In 2003, the Fisheries Act was altered so as to empower the Swedish Board of Fisheries to allocate fishing opportunities between different categories of professional fishermen, for example through the use of regional quotas, quotas to various groups of fishermen or individual quotas.

At present, the Board of Fisheries, the Processing Federation, the Fishermen’s Federation, the Pelagic Producer Organization and the Administrative County Boards are discussing a proposal for a new regime within the pelagic fishery. This regime includes individual transferable fishing opportunities.

The reasoning behind an introduction of individual transferable fishing opportunities for the pelagic fishery, is based on the fact that the problems within this fishery are not mainly biological, but related to a highly international market, and the fact the Swedish vessels’ main competitors, for example Norway, Iceland, Denmark and the Netherlands, have introduced some form of vessel-based yearly quotas.

The pelagic segment is over-capitalized and so reducing fleet capacity is necessary in order to increase profitability for this fishery; the maximum scrapping premiums available within the EU structural funds have proven not high enough to buy out pelagic capacity.

A system involving individual transferable fishing opportunities would enable fishing companies to better plan their fishery and to reduce capacity, but also involves restrictions on these companies’ possibilities of fishing for other species. Another element in this regime is to protect a small-scale local pelagic fishery.

Increased cooperation between fishermen, researchers and administrators

When the Common Fisheries Policy within the European Union was reformed as from 2003, it included the establishment of Regional Advisory Councils (RACs). RACs were to be set up to advise the Commission on fisheries management matters in respect of certain sea areas.

The Regional Advisory Councils shall be composed principally of fishermen and other stakeholders affected by the Common Fisheries Policy, such as representatives of the aquaculture and processing sectors, environment and consumer interests and scientific experts, from Member States having fisheries interests in the sea area concerned. Representatives of national and regional administrations have a right to participate in the RACs as members or observers.

The RACs may submit recommendations and suggestions of their own accord or at the request of the Commission or a Member State. To date, two Regional Advisory Council have been established, one for the North Sea and one for all pelagic fishery. Five more are expected.

At a national level, the Swedish Government has instructed the Swedish Board of Fisheries to investigate the scope for further regional co-management, in view of continued and increased work with new forms of fisheries management in coastal and inland waters. Regional development is the focus of this work, which should include ecological as well as social and economic aspects. The initiative is inspired by the Regional Advisory Councils mentioned above as well as integrated coastal zone management.

The Board of Fisheries has included six pilot projects of different characters, which involve professional fishermen as well as other stakeholders which locally have an impact on the fish resource, such as recreational fishermen, environment groups, the processing industry and universities. Part of the work is to define local and regional co-management, in order to develop co-operation and decision-making processes.

10. CONCLUSIONS

The conclusions below are either general, or specified for the main management agency, the Swedish Board of Fisheries.

Total expenditure for Swedish fisheries management, including scientific research, has been estimated at US$51.1 million, divided into the sub-categories outlined in section 4 as follows:

• Scientific research	19.1 (37.3 percent)
• Policy development & operational management	7.9 (15.5 percent)
• Enforcement	17.1 (33.5 percent)
• Corporate and administrative support	7.0 (13.7 percent)

First, it should be borne in mind that expenditure is related not only to fisheries, but also to the value of maintaining fish stocks for biodiversity purposes; some of the scientific research included relates to fish rather than fisheries. In addition, fisheries include fishing for both professional and recreational purposes – recreational fishing is a major leisure pursuit in Sweden – and fisheries management also includes the aquaculture and processing sectors.

Scientific Research is the biggest item. International co-operation, primarily within the International Council for the Exploration of the Seas, requires extensive data collection and analysis, including the operation of research vessels. Further, the sectoral responsibility for the environment, which the Board of Fisheries was given in 1998, has implied a broader remit for the Board's research and development activities; environmental and fisheries policy shall be integrated, and the Board of Fisheries has received earmarked funding for this work, amounting to about 10 percent of its total budget.

As for Policy Development and Enforcement, fisheries policy is a common policy within the European Union and so Swedish fisheries management is part of a 25-country fisheries policy, with the exception of some coastal fisheries as well as inland waters. This implies that the fisheries administration is obliged to implement a number of rules which may not necessarily suit Swedish conditions, or would have been deemed unnecessary had it been up to the national administration to decide. Expenditure for fisheries management, net of international development co-operation, has increased since Sweden's joining the EU. However, fisheries management is also likely to be more successful when involving all countries that fish in a certain water area, where common rules apply to all parties involved and when administrations can co-operate on the collection of data etc.

As was outlined in section 6, almost 80 percent of total expenditure is financed via direct Government funding. If EU and indirect Government funding is included, the figure is 90 percent. The remaining share stems mainly from hydropower and other companies. Hence, there is very little cost recovery from the Swedish fishery sector. It is worth pointing out that the Board of Fisheries is empowered by the Government to charge for the monitoring of the Common Fisheries Policy, a potentially important power which the Board has so far not utilized.

Another observation is that formally, fisheries management is almost exclusively delivered by authorities at different levels; the exceptions being the fishermen's rationing systems and the limited work carried out by Producer Organizations. It can be noted that in other EU Member States, the Producer Organisations play a more active role in fisheries management than is the case in Sweden. However, the system of advisory committees and consultative groups is evolving, as are co-management initiatives.

As for budget and evaluation systems, although it has been possible to estimate expenditure per main management category, partly based on a relatively detailed yearly planning document for the Swedish Board of Fisheries, follow-up on how much is spent in relation to different kinds of fisheries activities need to be further developed to enable a more detailed analysis. A more widespread use of time logging within the SBF will be an important tool in this process.

Also, there is little analysis of the effectiveness of expenditure. The Ministry of Agriculture, Food and Consumer affairs is requesting better focus in the Swedish Board of Fisheries' Annual Report on what the effects have been in different areas; the report currently tends to focus on what work has been carried out, rather than what this work has achieved.

Finally, it is worth noting that fisheries management is becoming increasingly complex, as environmental issues play a more prominent role and several other stakeholders than the fishery sector are involved. This is manifested in a more complex network of authorities and organizations working on fisheries management, but it is also providing scope for efficiency gains and a more effective management as information is shared and cooperation is enhanced.

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FINANCING FISHERIES MANAGEMENT: THE CASE OF NICARAGUA

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ACRONYMS AND SYMBOLS

ADPESCA	National Fisheries and Aquaculture Administration
AECI	Spanish Agency for International Cooperation
CAFTA	Central American Free Trade Agreement
ABC	allowable biological catch
AGCQ	annual global catch quota (see also TAC)
DAF	General Administrative and Finance Division of the MIFIC
CIPA	Center for Fisheries and Aquaculture Research (CIPA/ADPESCA)
DANIDA	Danish Agency for International Development
DGI	General Internal Revenue Department
DGRN	General Directorate of Natural Resources
DIPARAAN	Integrated Artisanal Fisheries Development Project in the North Atlantic Autonomous Region
F	fishing mortality rate
FAO	Food and Agriculture Organization of the United Nations
GBR	General Budget of the Republic
GDP	gross domestic product
IATTC	Inter-American Tropical Tuna Commission
IMF	International Monetary Fund
INFONAC	National Development Institute
INPESCA	Nicaraguan Fisheries Institute
JICA	Japanese International Cooperation Agency
MARENA	Ministry of Natural Resources and the Environment
MCS	Monitoring, control and surveillance
MEDEPESCA	Fisheries Development and Promotion Directorate
MHCP	Ministry of Finance and Public Credit
MIFIC	Ministry of Development, Industry and Trade
PASMA	Environmental Sector Support Programme
TAC	total allowable catch
TED	turtle excluder device
UN	United Nations

1. BACKGROUND ON NICARAGUA

Nicaragua is the largest country in Central America with a total of 129 494 km^2 (Figure 1). It has borders with Honduras and Costa Rica and the Pacific Ocean and the Caribbean Sea. Over the past 30 years, the country has endured devastating political upheaval and natural disasters that have caused enormous human suffering and social impact. An earthquake in 1972 killed 10 000 people and nearly destroyed the country's capital. The 1979 overthrow of the Somoza government and the subsequent civil war during the 1980s killed tens of thousand of people, and crippled the national economy. In 1998, Hurricane Mitch shattered the country's infrastructure and killed other thousands of people. Nicaragua's economy suffered severe economic decline during the 1984–1993 period that resulted in negative GDP growth which was 40 percent of that observed in 1977 and similar to the one in 1966. The income per capita in the same period had fallen to a level similar to 1945 and inflation reached an astonishing 33 500 percent in 1988.

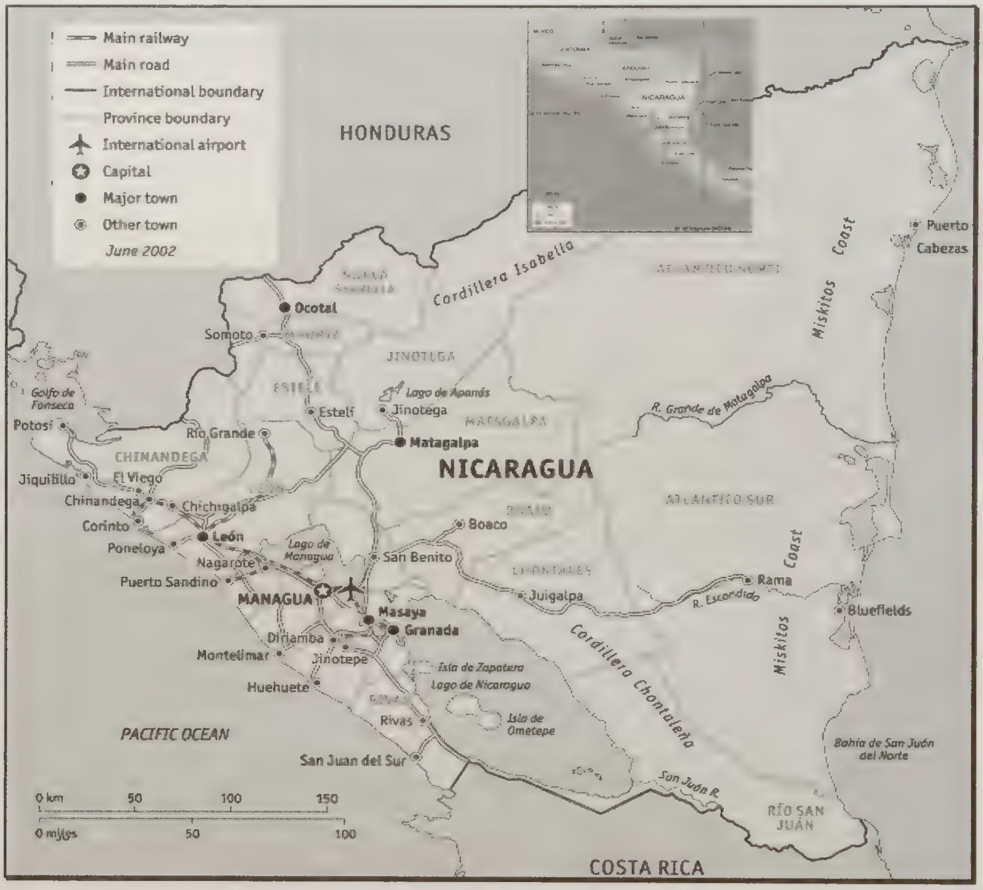
Main railway
Main road
International boundary
Province boundary
International airport
Capital
Major town
Other town
June 2002
HONDURAS
NICARAGUA
Cordillera Isabella
Ocotal
Somoto
JINOTEGA
ESTELÍ
Lago de Apanás
Estelí
Jinotega
MATAGALPA
Matagalpa
Golfo de Fonseca
Potosí
Río Grande
CHINANDEGA
Jiquilillo
El Viejo
Chinandega
Chichigalpa
Corinto
León
Poneloya
Lago de Managua
Nagarote
San Benito
Boaco
Puerto Sandino
MANAGUA
Masaya
Granada
Diriamba
Montelimar
Jinotepe
Huehuete
Isla de Zapatera
Lago de Nicaragua
Rivas
Isla de Ometepe
PACIFIC OCEAN
San Juan del Sur
0 km
50
100
150
0 miles
50
100
ATLÁNTICO NORTE
Miskitos Coast
Puerto Cabezas
R. Grande de Matagalpa
ATLÁNTICO SUR
CHONTALES
Juigalpa
Rama
R. Escondido
Bluefields
Cordillera Chontaleña
Bahía de San Juán del Norte
San Juán R.
RÍO SAN JUAN
COSTA RICA

Figure 1: Map of Nicaragua

Nicaragua has a population of about 5.4 million (2004) with a recent growth rate of about 3 percent per annum which is considered one of the highest in Latin America. This rapid population growth puts great pressure on the natural resources of the country, which calls for effective management in order to ensure their sustainable use.

Since 1990, after a democratically elected government, the country embarked on policies of economic liberalization, privatizations, fiscal discipline and broad public sector reform programmes Nicaragua started implementing some of the economic reform programmes proposed by the International Monetary Fund (IMF) and the World Bank. While progress was made toward macroeconomic stability over the past few years, Nicaragua still has one of the lowest per capita incomes in the world[2] and its economy is also one of the weakest. The country has achieved a positive sustained GDP annual growth in the order of 2 to 3 percent since 1994 but it has been far too low to meet the country's needs.

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[2] GDP per capita is about 740 US dollars (2003). GDP in 2003 was US$4 148 million.

The Nicaraguan Government changed its economic course and several reforms of the public sector, financial, trade and prices and public administration reforms were carried out. The Governmental institutions were drastically downsized with the consequent reductions in institutional budgets, premises and facilities available. The implementation of the law regarding the organization of the Executive Branch that was approved in 1998 by the National Assembly reduced the number of ministries from 15 to 12, and the number of decentralized institutions from 25 to 22. Armed Forces defence outlays alone fell from about 14 percent of the GDP in the 1980s to less than 3 percent in the last few years. As a result, public sector employment was reduced from 290 000 employees (24 percent of the economically active population) in 1990 to 80 000 in 2000.

Unemployment is officially around 22 percent, and another 36 percent are underemployed. The country suffers from persistent trade and budget deficits (Exports in 2004 were US$750 million while Imports were US$1.7 billion) and a high debt to service burden leaving it highly dependent on foreign assistance, as much as 25 percent of GDP. With historic massive foreign debt, chronic infrastructure issues and high unemployment, Nicaragua continues to be dependent on foreign aid and debt relief. Nicaragua also depends heavily on remittances from Nicaraguans living abroad, i.e. in the order of US$1.2 billion in 2004. The foreign debt was in the order of US$4 000 million until recently but because of Nicaragua being a beneficiary of the Heavily Indebted Poor Countries (HIPC) initiative, a significant fraction of the foreign debt was written off, but it remains a significant drain on the economy. Under these circumstances, the government of Nicaragua finds it very difficult to locate the necessary funds to invest in civil infrastructure and will remain greatly dependent on foreign economic aid and assistance, in the form of grants and loans.

The country is primarily agricultural but construction, mining, fisheries, and general commerce also has expanded during the last few years. Nicaragua has some of the most varied and abundant natural resources in Central America. Nicaragua's volcanoes are potential sources of geothermal energy and the rich volcanic soil they have created is ideal for producing coffee – the country's largest export. The country has rich forests of commercial timber in addition to mineral reserves, including gold. One of the key engines of economic growth has been production of commodities for export. However, traditional products such as coffee, meat, seafood and sugar continue to lead the list of Nicaraguan exports, while the fastest growth is now in tourism, in maquila goods (apparel), gold, and new agricultural products such as peanuts, sesame, melons, and onions.

Although the reorganization of the foreign debt and the resulting economic programme negotiated between the Executive and the IMF has guaranteed a government budget and has kept inflation under control, authorities are concerned about how little this programme has impacted economic growth and development, making it impossible to meet the targets of the poverty reduction strategy – one of the cornerstones in the Government's economic development and planning programme during 2003–2007.

According to the Nicaraguan Government (PND, 2004) as long as the economy does not grow at a sustainable higher rate, fiscal sustainability over the medium and long term will not be achievable. Given this situation, all the economic sectors are seeking protection in terms of dollarization. A large portion of the transactions in the country are indexed to the dollar or made in that currency. However, salaries and other consumption transactions are not, which create the coexistence of three currencies[3] and unbalance in the purchasing power of the people.

In the United Nations Human Development Index (HDI), Nicaragua is in position 118 out of 177 countries in the world (UNDP, 2004). Total labor force participation in 2004 was only 38.8 percent of the total population. The urban population is 54 percent of the total population compared to 76 percent in developed countries. Total life expectancy at birth is 69 years while infant mortality rate (per 1 000) was 31.7 in 2001.

Despite some progress in recent years in the industrialization process, the pillar of economic activity remains the primary sector and exports of traditional products. However, with the current international trend towards globalization, which the Nicaraguan government supports, Nicaraguan products face stiff competition on the local and international markets and in many instances is unable to compete successfully because of price and quality reasons, while its volume of production is generally insufficient to become a determining provider. At the time of this writing a free trade agreement (CAFTA) was approved in the USA with Central American countries which will probably facilitate exports but may result in an increase in imports of goods from the USA market. However, the approval in Nicaragua is still pending.

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[3] Although the Córdoba is still legal tender, the informal dollarization of the economy has generated the use of other two currencies: the Córdoba with maintenance of value and the US dollar. Except for salaries and other lesser transactions, most market operations are made in terms of these two currencies. Nonetheless, most dollars entering the economy come from family remittances and international donors and loans, which poses the risk of unsustainability given that the domestic economy is not generating enough foreign exchange.

The Nicaraguan fisheries[4] play an important role in the earnings of foreign currency in the country. The total export of Nicaragua in 2004 was valued at US$755.6 million to which the fisheries sector contributed US$96.7 million (13 percent of the total exports). The sector also plays a significant role as a source of employment and food for coastal communities, mainly in the east coast (Caribbean) of the country. The Nicaraguan fishery sector still has an important potential for growth in terms of fishery resources, product added value, employment opportunities and investments in infrastructure. In spite of its recognized importance the management of fisheries still needs to be strengthened.

On environmental issues and responsibilities, Nicaragua has signed a large number of international treaties on issues such as biodiversity, climate change, desertification, endangered species and hazardous wastes, among others. In marine and fishery matters, it is important to note that the country is a signatory to the Law of the Sea and the UN FAO Code of Conduct for Responsible Fisheries conventions. The basic concepts of these conventions have been incorporated in the fishery legislation and resulting policies. Environmental degradation through such activities as deforestation and inadequate traditional agricultural practices is a major issue of concern and can be primarily blamed on the significant levels of extreme poverty throughout the country.

2. INTRODUCTION

The importance of fisheries management to achieve and maintain fisheries sustainable is well recognized worldwide. However, financing fishery management is costly and not too many countries have the possibility to finance it in a proper way. Many developing countries fall in this group.

With national economies in the verge of bankruptcy and higher priorities in other areas such as in health and education it seems difficult for poor countries to allocate enough funds for fishery services: fisheries research, management and monitoring, control and surveillance (OECD, 2003). At the same time fisheries authorities have not properly figured it out the way on how to secure appropriate revenues from fishing by setting an adequate economic value of the fish resources and a subsequent cost recovery system to elucidate the cost of fishery management.

Presently, although many fishery management systems in developing countries could be partly funded with revenues from fishery activities a great deal is funded from public tax revenues that not always are generated from fishing.

As Keizire (2001) points out there are a number of reasons why cost recovery in fisheries is considered important:

- Well managed fisheries usually yield economic surplus that can be extracted from the fishery while the fishing industry continues to operate efficiently. Financing such fisheries is like subsidizing an industry that would otherwise finance itself. It is not economically justifiable to collect money by distortionary taxation to subsidize a profitable industry. This argument for cost recovery is based on the premise that financing fisheries management from public revenues increases the financial burden of the tax payers who may not be benefiting from the fishing industry
- Cost recovery can generate a stronger incentive for those who pay to demand better services to the fisheries agency in charge of fisheries management. It may also contribute to more efficiency in the provision of these services and fisheries management in general. If the fishermen or fishing firms pay for the costs of fisheries management, the management service providers will come under more pressure to deliver these services at the time and of the quality required.

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[4] Unless otherwise indicated, the term "fisheries" is in this document designated to include marine and freshwater aquaculture.

- Cost recovery reduces the need to finance fisheries management from public tax revenues. Economic theory reveals that taxes are generally distorting. In principle, cost recovery means that non-distorting taxation is substituted for distorting taxation.

The present document is an analysis of the way fishery management is financed in Nicaragua. This case study report is arranged in 9 main sections. Before this introduction Section 1 provides a general economic background on Nicaragua and following, Section 3 provides an overview of key fisheries and the management agencies. The same section provides a summary of the characteristics of the Nicaraguan fisheries and the management agency. The last part of this section describes an evolution and status of the current fisheries management regime.

The fourth section opens by developing on the budget allocation process to fisheries management activities; Section 5 categorizes the expenditures and identifies approaches to track expenditures. Analyses of financial information and presentation of financial indicators is in Section 6, while in Section 7 the sources of funding are identified. Section 8 presents an overview of the incentive systems to the fishery sector in Nicaragua and a discussion on cost recovery mechanisms; use of non government funds and other issues is done in section 9. Section 10 provides information on fisheries management service providers and actions or options to meet fisheries management objectives. Section 11 draws some conclusions and recommendations.

3. OVERVIEW OF KEY FISHERIES AND THE MANAGEMENT AGENCY

3.1 Characteristics of the fisheries

Nicaragua is the largest country in Central America with 129 494 km^2. The country has a total of 1 231 km of continental boundaries, of which 309 km are with Costa Rica and 922 km with Honduras while it also borders indirectly with El Salvador through the Gulf of Fonseca. The country has 940 linear km of coastline, of which 530 km are on the Atlantic and 410 km on the Pacific coast. The continental shelf in the Caribbean is the largest in Central America with approximately 42 734 km^2 while the shelf in the Pacific Ocean is of 13 856 km^2.

In addition, Nicaragua has important inland waters as the Lake Nicaragua or Cocibolca (8 264 km^2) and Lake Xolotlan or Managua (1 064 km^2).The latter is by the capital city Managua. Nicaragua's climate is tropical with two clearly distinguishable seasons: a dry season from October to April, and a rainy season from May to September. Average air temperature is around 32°C. The occurrence of El Niño Southern Oscillation cycle plays a major role in the weather patterns, mostly related to longer and more intense dry season conditions and significant changes on oceanographic regimes that affect fisheries, mainly along the Pacific Coast.

Nicaragua maintains territorial disputes with Colombia, Honduras, Costa Rica and El Salvador. With Colombia the issue concerns the Archipelago of San Andres and Providencia, and the Quita Sueño Bank. The maritime boundary question in the Gulf of Fonseca continues to be the reason of (diplomatic) conflict with El Salvador and Honduras. More recently, the issues of the extension and appropriation of a substantial part of country's Caribbean continental shelf through a joint action by Honduras and Colombia, as well as the legal dispute over navigational rights on the San Juan River on the border with Costa Rica, have taken on major relevance.

Until the 1950s Nicaraguan fisheries were artisanal, however, starting in that decade industrial fisheries started to develop and by the end of the 1970s earnings from shrimp and lobster exports to United States provided major inputs to the national economy. By the 1980s the fishing effort decreased substantially, mainly due to the lack of fishing vessels during the wartime and because of the economic blockade of the US Government. Both occurrences caused a dramatic decline in fishery landings. A positive effect was that populations of the target capture fisheries species could recover from rather intensive levels of fishing.

With the return of the democratically elected government in 1990, matters changed dramatically. The fishing industry was considered a prime sector for obtaining foreign exchange, as a source of food for local populations and as a source of employment. During this period the government abandoned the direct State control over the sector and looked for greater involvement of the private industry regarding fishery development.

Several measures were taken to promote the rapid expansion of the fishing capacity, particularly in the shrimp and lobster sub-sectors. These recursive actions meant that foreign vessels were allowed access to Nicaraguan fishery resources under favourable conditions while national producers and processors were granted certain benefits to lower operating costs to promote exports. Because of the lack of surveillance, a considerable illegal high sea fisheries as well as transhipment of fishery products at sea took place. This practice is reportedly still going on, although at a minor scale, but is by many considered a major factor in the problems related to the decreasing economic growth of the sector and issues related to resource utilization and depletion.

On the other hand, artisanal fisheries have developed rapidly and widely over the past 20 years and their contribution to the national production has been recognized. Several government programmes, as well as various development projects financed through bilateral agreements and through external independent organizations, were initiated to assist the artisanal sector in the productive as well as the socioeconomic aspects of their activities.

Initially, the artisanal fisheries on the Caribbean coast were primarily focused on the exploitation of spiny lobster through diving operations and on dried seabob shrimp from the various estuarine systems. With the increase in the number of fishers, the opening of export markets for products other than shrimp and lobster, and the availability of more and different fishing gear, types and technologies, made it possible to diversify into other products, particularly finfish.

The contribution of the fishery and aquaculture sectors to the GDP increased rapidly from 1993 to 1996 (Table 1) mainly as a result of the governmental incentives; thereafter, it has grown at a more reduced rate, although overall yearly export earnings continued to increase.

Table 1: Fishery sector participation in GDP (million 1980 Córdobas)

Year	GDP	Primary Sector	Fisheries	Fisheries/GDP
1990	18 142	4 495	49.6	0.27
1991	18 107	4 320	72.1	0.40
1992	18 178	4 452	91.1	0.50
1993	18 106	4 533	148.2	0.82
1994	18 710	5 028	218.3	1.17
1995	19 518	5 278	325.8	1.67
1996	20 449	5 654	332.8	1.63
1997	21 494	6 125	352.8	1.64
1998	22 367	6 337	396.5	1.77
1999	24 031	6 848	403.0	1.68
2000	25 448	7 705	458.9	1.80
2001	26 251	7 945	414.5	1.58
2002	26 526	7 714	402.2	1.52

Source: Central Bank of Nicaragua & AdPesca

3.1.1 Target species and annual landings

The Nicaraguan fishery resources base is mainly oriented toward the export market and, to a lesser extent, towards domestic consumption. The Caribbean spiny lobster and the coastal shrimps are the most important target species which make up the bulk of the foreign exchange earnings by seafood products. The main export markets include the United States (about 90 percent of the exports), France, Spain, Japan and Germany. Most of the exported fish commodities are frozen with low added value.

According to the Nicaraguan Fishery Law fish resources are classified in:

- *Unexploited*: resources are not exploited.
- *Sub or underexploited*: Surplus of biomass is available and the fisheries are open access.
- *Fully exploited*: No surplus of biomass is available. The fishery is under a limited access mode through fishing licenses and permits. An Annual Global Catch Quota or Total Allowable Catch (AGCQ) is set each year. The AGCQ derives from an Allowable Biological Catch (ABC) estimated under a constant reference fishing mortality (F0.1) strategy.
- *Overexploited*: the biomass is below critical levels. The fishery is closed for recuperation of the stock.

According to the type of fishery resources exploited by industrial and artisanal[5] fleets, these can be classified in four groups:

1. Caribbean and Pacific Coastal shrimp
2. Caribbean spiny lobster
3. Finfishes and sharks in both coasts (Caribbean and Pacific) and inland waters (lakes and lagoons)
4. Miscellaneous (not included in any of the preceding three categories)

Finfish fisheries are the most important in terms of volumes landed and exported while crustacean fisheries are the most economically important. Miscellaneous fisheries comprise resources that have been sub exploited (e.g. green spiny lobster in the Pacific, Pacific deep water shrimps, Caribbean queen conch) or that little information is available about them (e.g. sea cucumbers, Kermit crabs or black clams)

Shrimp resources

The shrimp fisheries are the oldest industrial fishing activity in the country which started in the 1960s and has contributed significantly in the earning of foreign exchange. At the same time, the resource is also an important source of income for the artisanal fishers. The most important shrimp fishery is found in the Caribbean where it extends over the entire continental shelf, while some artisanal fishery takes place in the shallow coastal lagoons.

The industrial fishing fleets use Florida-type shrimp trawlers of 19 to 23 m in overall length made out of fiberglass or metal hull, powered with diesel inboard motors with 200 to 400 HP. Shrimp trawling systems can consist of single or twins trawls. The use of TEDs is compulsory and a three nautical mile strip along the coast for the exclusive use of artisanal fishers has been defined. The artisanal shrimp fishers use cast nets, gillnets and small trawls, depending on the target species and area.

The shrimp fishery in the Pacific Coast of Nicaragua targets three main commercial species, red shrimp (*Farfantepenaeus brevirostris*), white shrimp (*Litopenaeus vannamei* and *L. stylirostris*), and brown shrimp (*L. californiensis*). However, for the past ten years the landings of seabob shrimp (*Xiphopenaeus riveti* and *Trachypenaeus byrdi*), locally called "chacalín", are occupying an increasingly important role, on occasions making up 40 to 60 percent of the total shrimp landings.

The abundance of shrimp in this area appears to be related to the extraordinary changes that occur with El Niño–Southern Oscillation events, but an overall declining trend in the abundance is observed since the mid 1970s. This fishery is less important than the Caribbean shrimp fishery and it was greatly affected in 1998 due to the hurricane Mitch. The white shrimp is also important as the source of shrimp larvae for the culture industry that is principally located on the Pacific coast.

The industrial Pacific coast shrimp fishery is managed under an Annual Global Catch Quota (AGCQ) and access is limited by fishing licences and annual permits. At present 16 fishing licenses (for the same number of vessels) has been issued but in practice an average of 8 to 10 shrimp boats have been operating. The AGCQ for the 2005–2006 fishing season has been set at 227 tonnes. There is a 2 month closed season (April and May each year). The white shrimp *L. vannamei* is the main component of the ever growing shrimp culture industry in the northern west coast. The post larvae of this species are also fished by artisanal fishers to supply shrimp farms with natural seed. This latter activity has been declining for the growth in the use of laboratory reared larvae.

The industrial shrimp fishery in the Caribbean is supported by two species mainly, red shrimp (*Farfantepenaeus duorarum*), the most important due to its abundance, and the white shrimp (*Litopenaeus schmitti*). Artisanal fisheries take place in the numerous coastal lagoons along the coast for the latter but also for the sea bob *Xiphopenaeus kroyeri*. The fleet consists of national (including Korean nationalized) and foreign shrimpers (US fleet). The fishery is also managed under an Annual Global Catch Quota (AGCQ) and access is limited by licences and annual permits. At present 55 fishing licences (for the same number of vessels) have been issued but in practice an average of 45 boats have been operating. The AGCQ for the 2005–2006 fishing season has been set at 1 818 tonne. In 2005 there was a one month closed season (15 April–15 May).

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[5] By legal definition an artisanal boat is a fishing craft with 15 or less m in length. Fishing boats greater than 15 m in length are considered industrial irrespective of the level of mechanization.

A deep water trawl fishery (over 100 fathoms deep) for the nylon shrimp *Heterocarpus* spp. in the Pacific coast is presently being developed. Currently, eight Florida-type shrimp vessels are deployed in this fishery. It has also been assessed that a large stock of the squat lobster *Pleuroncodes planipes* is available along the Pacific coast which still remains unexploited. In the Caribbean coast some deep water crustaceans have been also identified (nylon shrimp, deep water crabs and deep sea lobsters), but no fisheries have been developed for these potential resources.

Lobster resources

In economic terms, Caribbean spiny lobster, *Panulirus argus*, fishery is the most economically important, despite the fact that shrimp landings are larger in weight. It accounts for almost 50 percent of the total exports of fisheries and aquaculture products.

The species is caught with lobster wooden traps and by scuba diving in coastal shallow waters up to 50 m in depth. The industrial fleet is national (mainly nationalized Honduran vessels) although this fishery is undergoing a process of "artisanalization", with artisanal landings steadily increasing and, at present, comprising more than 50 percent of the Caribbean spiny lobster landings. Nearly the entire production is exported. Although there is also a lobster fishery in the Pacific Ocean (*P. gracilis*), catch is relatively low (on the order of 36 ton tail-weight in 2004).

The Caribbean fishery is managed under an AGCQ and has limited access through licenses and annual permits. At present 87 fishing licenses (61 for trap vessels and 26 for divers' vessels) are issued, but in practice an average of 74 to 76 vessels have been operating. The AGCQ for the 2005–2006 fishing season has been set at 1 818 tonnes. Other management regulations are a 3 month closed season (April to June), a minimum size limit of 5 ounces of tail weight, the regulation of the dimensions of the traps and escapement gaps, as well as the number of traps that can be used per vessel. However, it has proven to be a fishery which is difficult to manage because of the harvesting methods used (traps and diving), the heterogeneous fleet involved (artisanal and industrial), and the fact that the fleet operates over wide areas on the Continental shelf.

Finfish fisheries

The finfish resources support the most important fisheries in terms of weight landed. They are also important from a social stand point due to the amount of labor force involved and because they provide a large supply of fish to coastal communities. There are no species specific fisheries; however, the largest catches landed by species group are made up of snappers (*Lutjanus* spp.), snooks (*Centropomus* spp.*)*, sharks (several Carcharhinidae species) and croakers (*Cynoscion* spp.). The fisheries in the Pacific coast are relatively more important than those in the Caribbean coast. In general, a large fraction of the artisanal boats are made of fiberglass with overall lengths of 5 to 10 m, and equipped with outboards motors of up to 75 HP. The crew consists of 3 to 5 fishers and they can use several fishing gears such as gillnets, trammel nets, hand lines or bottom longline.

The larger pelagic fish fishery in the Pacific coast is relatively new and has increased in importance since 1995. The fishing fleet is artisanal with longliners in an operational range of up to 100 miles away from the coast. This fleet consists of 27 fishing boats with less than 15 m in length and powered with 100–150HP inboard engines. Longlines can be up to 25 nautical miles long. Target species are the dolphin fish or mahi-mahi *Coryphaena hippurus*, thresher shark *Alopias vulpinu*s and the silky shark *Carcharhinus falciformis*. The commercial fishery of small pelagics is almost non existent in Nicaragua.

The tuna fishery is not fully developed with only three Nicaraguan licensed long-range purse seiners with a total well capacity of 3926 m3 operated in 2004 in the eastern Pacific Ocean. Nicaragua is member of the IATTC and holds a carrying capacity quota of 4500 t. No tuna processing facilities or ports are available for this type of industry in the country.

In inland waters the tilapia (*Oreochromis* spp.) is one of the main species exploited along with snooks. The largest fishery takes place in the Lake Nicaragua, although there is also an important inland/estuarine fishery on the Caribbean Coast.

The finfish fisheries are considered mainly artisanal in character and of free unlimited access, and where with the exception of a few species, no regulations apply. There is hardly any current information on the state of exploitation of the fish resources, which is of particular importance for these fisheries where the situation appears critical in view of the falling yields and the uncontrolled increase in the number of fishers.

Aquaculture

In aquaculture the major component is shrimp culture in the northwest of Nicaragua. Its development started in the early 1990s, predominantly in the estuarine areas associated with the Gulf of Fonseca and the Estero Real.

This industry experienced an explosive growth from 322 ton in 1993 reaching over US$30 million in exports in 1998. Effects of Hurricane Mitch in the late 1990s impacted production, and production peaked at 7 849 tonnes in 2004. The farmed shrimp are produced on approximately 30 privately owned farms and 152 farms operated by cooperatives. Private farms operate around 6 000 hectares of ponds, while the small and medium size producers organized in cooperatives operate 2 000–2 500 hectares. No shrimp culture takes place in the Caribbean coast.

The level of shrimp production from aquaculture has exceeded both in weight and value that from the marine shrimp fisheries. Shrimp culture is therefore an important economic activity in Nicaragua. At present the shrimp culture industry system (farms, laboratories and natural post larvae production and storing centers, and seafood processing plants) generates around 14 000 permanent and temporary jobs. In Nicaragua there are also five shrimp post larvae laboratories producing from 10 to 300 million of post larvae. The Nauplii is imported from El Salvador and Panama. The levels of production are growing because now some 70 percent of the shrimp farms are using laboratory reared post larvae. In the early 1990s almost all farms were using natural post larvae collected in mangrove areas.

There are some 9 000 hectares in production of the white shrimp *Litopenaeus schmitti* and *L. stylirostris*. However, the arrival of the white spot viral disease and the Taura Syndrome in the late 1990s, and the flooding of many of the shrimp farms as a result of Hurricane Mitch in October of 1998, raised questions regarding the sustainability and further growth of this subsector. Overall, Nicaragua lost 25 to 30 percent of its 1998 harvest due to above mentioned flooding and diseases, much of this from the cooperative shrimp farms. The industry suffered a overall loss of approximately US$8 million.

Current production methods in Nicaragua utilize large acreage ponds, with low stocking density rates and constant water exchange to maintain oxygen levels, thus protecting production from diseases and contamination.

Fish farming is much less developed in spite of the land and water available in the country. The main fish farming project is the tilapia, *Oreochromis niloticus*, cage culture carried out by one company in Lake Nicaragua. The culture operation uses sex reversed all male tilapia fingerlings. The Tilapia culture in Lake Nicaragua could represent a thriving business with an estimated annual production of 3 000 tonnes; however, the operation has not been successful for various reasons – including claims of the environmental risks to the lake that such activity might have – but no claims have been scientifically substantiated thus far. It should be noted that tilapia was accidentally introduced in Lake Nicaragua long before the culture activities started, and an artisanal fishery for wild tilapia has existed for some time in the lake.

In 2004, total Nicaraguan exports of fishery and aquaculture products were valued at US$96.7 million of which US$11.6 million were trawled shrimp, US$25.7 million were cultured shrimps, US$42.6 million were lobster tails, US$12.1 million from finfish, US$0.26 million from lobster meat (small quantities of meat taken from the head), and US$4.2 millions were others products, e.g. crabs, Caribbean queen conch, oysters, black clams, shark fins, dried fish. The Nicaraguan fishery exports are presented in Table 2.

Table 2: Nicaraguan fisheries exports from 1999 to 2004 (tonnes, millions US$)

	Tonnes						US$ x 1000					
	1999	2000	2001	2002	2003	2004	1999	2000	2001	2002	2003	2004
Caribbean coast	3 938	4 957	3 828	4 238	3 969	4 092	59 984	78 818	54 064	62 689	53 285	56 535
Shrimp (capture)	1 657	2 097	1 750	1 998	1 957	1 838	14 649	18 047	13 548	14 165	12 134	11 032
Lobster tails	1 517	1 971	1 224	1 336	1 171	1 289	41 552	56 288	35 947	43 970	37 146	41 449
Fish	714	818	811	862	799	862	2 950	3 436	3 293	3 579	3 238	3 230
Lobster meat	50	71	44	42	43	46	302	550	311	294	261	465
Other products						57	530	497	965	682	506	558
Pacific Coast and freshwater	5 709	5 687	5 866	5 672	7 073	8 923	37 457	45 309	36 338	31 629	32 781	40 193

	Tonnes						US$ x 1000					
	1999	2000	2001	2002	2003	2004	1999	2000	2001	2002	2003	2004
Shrimp (capture)	945	338	377	230	291	134	8 278	3 751	3 329	1 849	1 788	654
Shrimp (culture)	2 879	3 530	3 368	3 047	4 270	5 716	21 263	32 484	21 741	17 081	20 089	25 798
Lobster tails	33	45	85	53	34	39	680	1 163	2 177	1 495	945	1 156
Fish	1 852	1 766	2 031	2 339	2 478	2 658	6 858	7 101	8 217	8 602	8 289	8 886
Lobster meat	1	8	5	2			29	150	43	24	3	
Other products						376	349	659	830	2 578	3 455	3 698
TOTAL	9 647	10 645	9 695	9 910	11 042	13 015	97 441	124 126	90 402	94 318	87 854	96 728
Shrimp (capture)	2 602	2 435	2 127	2 229	2 248	1 972	22 928	21 798	16 878	16 014	13 922	11 686
Shrimp (culture)	2 879	3 530	3 368	3 047	4 270	5 716	21 263	32 484	21 741	17 081	20 089	25 798
Lobster tails	1 550	2 016	1 308	1 389	1 205	1 328	42 232	57 451	38 124	45 464	38 091	42 605
Fish	2 566	2 584	2 843	3 202	3 277	3 520	9 808	10 537	11 510	12 181	11 527	12 116
Lobster meat	51	80	49	44	43	46	331	700	354	319	264	266
Other products						433	879	1 156	1 795	3 260	3 961	4 256

3.1.2 Number and type of harvesters

In 2000 the fishery sector was the 10th most important source of employment in Nicaragua. However, it should be mentioned that besides from being an important productive and commercial activity, many people seek fishing as an important part of their subsistence way of life, particularly those living in coastal areas.

Data available from the Central Bank of Nicaragua up to year 2002 on the economic occupation of the population show that a total of 30 000 people were employed in the fisheries and aquaculture subsectors, which would indicate that an estimated average of 150 000 people depended on the sector for a living. These figures also include the industrial fisheries (Table 3).

Table 3: Workforce employed in fisheries sector in relation to the national labor force (1995–2002, ′000 persons)

Year	National Labour Force	Fisheries	Aquaculture	Fisheries & Aquaculture vs. National Labor Force (%)
1995	1 228.2	9.1	n.a.	0.74
1996	1 291.8	9.3	n.a.	0.72
1997	1 369.9	10.2	n.a.	0.74
1998	1 441.8	17.4	20.0	2.59
1999	1 544.2	18.1	23.5	2.69
2000	1 637.1	18.3	23.5	2.55
2001	1 697.6	17.6	n.a	1.03
2002	1 720.0	19.7	11	1.14

Source: Central Bank of Nicaragua & Adpesca.
n.a. = not available
Note: Includes plant personnel, service personnel and fishers.

The subsistence aspect of fishing and the open access in many of the fisheries complicates the enumeration of the official number of people directly involved in fisheries as a considerable number of artisanal fishers are only active in the fisheries:

1. when they have nothing else to do
2. when a major fishing season is open
3. depending on the profitability of the various employment opportunities at hand
4. when the other (mainly agricultural) activities do not require their presence

In addition, there is no official national or provincial register of artisanal fishers yet implemented, but this is a problem that will be minimized as a result of the process that was initiated in 2004 to decentralize management of artisanal fisheries to local governments in places in which there are fishery activities. Thus far and in a few areas, attempts have been made by the pertinent government agencies and special interest groups to establish a register of artisanal fishers in order to monitor their fishing effort, but these have been discontinued as formal governmental assistance or funding aspects have hindered follow up work.

In recent years, various censuses have been conducted and although they have taken place in different areas at different times, the methodologies used were virtually identical, which facilitates comparisons and joint calculations. In 1995, a census was conducted with the support of PRADEPESCA (PRADEPESCA, 1995), a regional fisheries development programme financed by the European Union. Although other local census took place previously, it appears that the PRADEPESCA fishery census effort was the first attempt to conduct an integral account of the fisheries sector which covered the entire national territory. Table 4 shows the overall data obtained.

Table 4: Nicaraguan fishing communities and fishers, 1995

	Caribbean coast	Pacific coast	Inland water fisheries	Total
Communities	45	38	24	107
Fishers	6 762	3 772	730	11 264

Source: PRADEPESCA/MEDEPESCA, 1996

In the period 1999–2002 a second census with national coverage took place (ADPESCA, 2002). With funding from The Netherlands and Spain, through their respective development agencies, the census focused on the artisanal fisheries sector. The census also contains substantial information on demographic and socioeconomic aspects of the artisanal fisheries population.

According to the overall combined census results, a total of 112 fishing communities existed in year 2000 with a total population directly active in fisheries of 18 335 persons. This number consists of fishers, middlemen (intermediaries) and persons involved in aquaculture. Of those, 11 650 people were directly involved in artisanal fishing activities, 2 300 in services related to the artisanal fisheries, 2 852 on board industrial fishing vessels (mainly spiny lobster) and 1 533 in fish processing plants. Aquaculture activities showed important growth and accounted for 23 500 jobs in year 2000, of which 15 000 work directly on the farms, some 8 000 were shrimp larvae fishers ("larveros") and 500 persons found work in sector-related activities. The available figures, subdivided by specific economic activity within the fisheries are shown in Table 5.

Table 5: Distribution of exiting employment according to major activity (2000)

Activity	**Caribbean coast**	**Pacific coast**	**Total**
Industrial: shrimp	315	270	585
Industrial: Lobster	2 128		2 128
Industrial: finfish	53	86	139
Artisanal: shrimp	n.a.	n.a	
Artisanal: lobster	450		450
Artisanal: finfish	7 400	3 800	11 200
Services	600	1 700	2 300

n.a.= not available

An interesting statistic is that 76 percent of the artisanal fishers interviewed indicated that they combine their fishing operations with another productive activity, mostly agriculture and commercialization, in order to supplement their income from fisheries (which is considered insufficient to make ends meet). Of the artisanal fishers, about 63 percent indicated that they initiated primary education, but 73 percent was unable to finish it for a variety of reasons. Some 32 percent had some degree of secondary education and the remainder had attended schools of higher learning, although only 84 individuals indicated that they had a university degree.

In view of the fact that fish consumption in Nicaragua is generally low (some 5 lb per person per annum), it can be assumed that nearly all industrial fishing and aquaculture operations are exclusively for exports. This is also confirmed by the production and export statistics. It is not known which proportion of the artisanal fisheries is involved in subsistence fishing, but from interviews with representatives of the sector it can be inferred that this percentage could be around 15 percent of the total artisanal population of fishers. However, it should also be noted that many fishers only fish commercially when conditions are appropriate.

As far as the gender component of the fishers is concerned, the latest census indicates that 9 out of every 100 persons directly involved in harvesting are women. It also showed that even 17 out of every 100 persons are women, but this includes women who are active as "middlewomen" (intermediaries). There remains the suspicion that the proportion of women might be even higher as many women might not have been enumerated as their involvement is considered an extension of the husband's activity or simply not reported. On the Pacific coast women are apparently more directly involved in fishing, while on the Caribbean coast they are mainly active in trade-related activities.

The overall working conditions for those active within the harvesting activities of the fishery sector are very much determined by the overall low profitability levels, the limited means of the competent authorities to assure on the compliance of existing fishery regulations, and the open access situation that still applies in the artisanal fisheries. In general, working conditions on the industrial fishing boats are rather basic and little attention is paid to safety standards. In the artisanal activities no standards apply, and – if they exist – they are not enforced, and it is up to each individual to consider what is best. Very few workers are covered by social security or any other kind of insurance. In general terms, there is more and accurate information of the number of fishers in the industrial fleet than in the artisanal fisheries.

Table 6 shows other estimates of ADPESCA on persons working in the sector. This information is based on different sources of information (processing plants data, personal interviews, etc.), than the data for the current number of fishers. According to Table 6, there are some 16 000 fishers currently working in Nicaragua. Table 6 also shows that 82 percent are artisanal fishers and that 64 percent are working in the Caribbean coast. It is important to note that on the Caribbean coast more than 90 percent of the fishers are of indigenous origins belonging to the Miskito ethnic group followed by mestizos and creoles.

Table 6: Number of fishers in the industrial and artisanal fleet: Main fisheries: coastal shrimp (trawling), spiny lobster (diving and pots) and finfish (longline, gillnets)

	Caribbean coast				Pacific coast				Inland waters		TOTAL			
	2000	2001	2002	2004	2000	2001	2002	2004	2002	2004	2000	2001	2002	2004
TOTAL	10 393	9 899	9 940	10 642	4 109	4 156	4 479	4 448	1 351	1 351	14 502	14 055	15 769	16 441
Industrial	2 543	2 049	1 841	2 543	309	356	376	345	n.a.	n.a.	2 852	2 405	2 216	2 888
Shrimp boats	315	316	318	336	270	94	75	73	n.a.	n.a.	585	410	393	409
Crew lobster boats (pots)	448	417	348	636	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	448	417	348	636
Crew lobster boats (diving)	280	228	144	276	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	280	228	144	276
Divers (lobster)	1 400	988	936	1 196	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1 400	988	936	1 196
Longliners (fish)	20	20	15	24	24	250	288	260	n.a.	n.a.	44	308	303	284
Artisanal (fish and lobster mainly)	7 850	7 850	8 099	8 099	3 800	3 800	4 103	4 103	1 351	1 351	11 650	11 650	13 553	13 553
Fishers	7 850	7 850	8 099	8 099	3 800	3 800	4 103	4 103	1 351	1 351	11 650	11 650	13 553	13 553

Source: ADPESCA.

n.a. = not applicable

In spite of the marine and freshwater resources available, sport fisheries are not well developed, and there is a large potential for growth of this sector. At present eight sports fishing tournaments take place, two of them international, but the number of sport fishers is unknown. The main organization is the Nicaraguan Sport Fisheries Association which has 60 members. Sport fishing is primarily carried out on an individual basis.

3.1.3 Locations of fisheries

Most of the fisheries operate on the continental shelf, coastal lagoons and estuarine areas of the Pacific and Caribbean coasts, as well as in inland freshwater lakes and lagoons. Offshore fisheries can be considered those for larger pelagics as mahi mahi, sharks, and deep water shrimps, both in the Pacific coast. Long range fisheries are those carried out by Nicaraguan flagged purse seiners that are not based in the country, i.e. tuna fishing is carried out in the Eastern Tropical Ocean and landings are reported outside Nicaragua.

3.1.4 Method of harvesting

Trawling for coastal shrimp demersal resources and trap/diving for the Caribbean spiny lobster are the main industrial fishing techniques, while the inshore small scale fisheries use mostly gillnets, cast nets and lines. Caribbean spiny lobster is caught by diving and lobster traps (wooden traps) in mechanized or non-mechanized vessels and boats in the industrial and artisanal fisheries. Currently, there is a fleet of 61 industrial Caribbean spiny lobster trap licensed vessels and 26 licensed industrial Caribbean spiny lobster diving vessels. Estimates of the total numbers of lobster traps in Nicaraguan Caribbean waters vary widely, ranging up to 500 000 traps.

Approximately 800 artisanal and unregulated smallscale boats are engaged in commercial spiny lobster exploitation, generating more than 50 percent of the spiny lobster annual landings. The Pacific coast spiny lobster is caught by diving or with gillnets (known locally as “lobster trammel nets”), and it is an artisanal fishery. No data on the number of divers or nets are available.

Shrimp fisheries are carried out by industrial trawlers, both in the Caribbean and Pacific coasts. Some artisanal fishers in coastal lagoons use cast nets and small scale trawling. In the Pacific coast fishing for shrimp larvae is carried out by artisanal fishers using a gear known locally as “chayo” and a fishing bag in estuarine waters. Finfish are caught with gillnets and longlines in artisanal fisheries. (An exception is the long range tuna industrial fishery with purse seiners.)

At present, all fisheries and fishing related operations in Nicaragua, except for noncommercial self-supporting activities, have to be licensed. In the commercial shrimp and lobster fisheries this functions as a limited entry regulation. In the artisanal fishery the license is a fishing fee. Subsistence fisheries are exempted from fees. Licenses are issued annually, are nontransferable and can be revoked by the fisheries authorities.

Industrial fisheries are carried out by intermediate size (16–25 m) vessels, mainly involved in shrimp trawling and lobster fishing. In total, 173 and 59 industrial fishing vessels operate in respectively Nicaragua’s Caribbean and Pacific coast. They land their catches at three harbours in the Caribbean Coast (Puerto Cabezas, Corn Island and El Bluff) and at two harbours on the Pacific coast (Corinto and San Juan del Sur). Artisanal fishers land their products in the above mentioned places and also in many scattered sites along the coast, making these landings difficult to control and monitor.

3.2 The Management Agency

3.2.1 Evolution of fisheries management

Before 1980 fisheries management in Nicaragua was almost non existent. Fisheries were under the National Development Institute (INFONAC) and the fishery legal framework consisted of the General Law on Exploitation of the Natural Assets, published in The Gazette, Official Newspaper 83 of April 17 1958 which was modified in 1961 by the Special Law on Exploitation of Fisheries and its bylaws. These laws contained general guidelines for the conservation of the fishing resources. However, none of them contained strategic objectives for fisheries management.

After the Revolution and the advent of a centralized political and economic system (1979–1990), fishery management was carried out by the Nicaraguan Institute of Fisheries (INPESCA) which was, in fact, a Ministry of Fisheries. The former fishery legal framework was not used but fishery management was run by Executives Orders instead. These orders were of diverse nature depending on the requirements for adapting property rights and access to the fish resources according to the new nature of the economy of Nicaragua. It must be underlined that during this period a comprehensive institutional and organizational development process for fisheries management was carried out with the support of the former socialist countries and northern European countries.This proceess settled down the foundations that are still the basis of the current fisheries management in the country. At the end of the 1980s the INPESCA was transformed in the Nicaraguan Fisheries Corporation but the organizational arrangement remained the same.

With the change of the political and economic system starting in 1990, the legal fishery management framework underwent a series of dispersed rules and regulations, some confusing and even contradictory, in the form of executive or ministerial orders and official statements which were very easily amended or changed by the government authorities in command. Fisheries management started to be very much influenced by the emerging privately owned fishing industry and the organizational structure also changed. The INPESCA was downsized and transformed into a General Directorate under the Ministry of Economy, loosing its financial independence. Additionally during this period, the first attempts at passing a new fishery law were made.

From 1993 to 2004 several government bills were worked out in order to have a new fishery law in place instead of the several (and ever changing) ministerial decrees and orders. At the same time a legal strategy was developed for the establishment of the new fisheries management system where clear rules, standards and objectives were defined. Finally, the new fishery law was passed in December of 2004, and its bylaws were passed in February of 2005.

3.2.3 The current fisheries management regime

At present, the fisheries services are provided by the national government through the National Fisheries and Aquaculture Administration (ADPESCA, the old INPESCA) and the Directorate of Natural Resources (DGRN), both under the Ministry of Development, Industry and Trade (MIFIC) that was renamed from the Ministry of Economy in 1998. The number of people employed in these two governmental offices is less than 50, and the annual budgets are on the order of US$400 thousand. Figure 2 shows the organizational chart of the MIFIC.

The DGRN is the policy and planning directorate dealing with the management of the State-owned natural resources, i.e. mining, fisheries and aquaculture, and forest in national lands. ADPESCA is the executive governmental organization responsible for research, development of fisheries, and monitoring, control and surveillance (MCS). ADPESCA is organized in three units: Fisheries Research (the Center for Fisheries and Aquaculture Research –CIPA), Fisheries and Aquaculture Development, and MCS. Both DGRN and ADPESCA report to the Secretary General of the MIFIC who is in charge of the fishery sector in the upper levels of the ministerial authority (Figure 2).

The new Nicaraguan Fishery Law mandates (Article. 13) that the Ministry of Development, Industry and Trade (MIFIC) is the authority in charge of the management of the fishery resources, which according to the Constitution, belong to the Nicaraguan State. It also gives the authority to enforce the law and the regulations through the National Fisheries and Aquaculture Administration (ADPESCA) and the General Directorate of Natural Resources (DGRN) without prejudice on the authority granted to other institutions of the Executive Branch.

Furthermore, in the new law the Fisheries National Commission has also been created as an advisory forum for consultation and agreement regarding fisheries and aquaculture issues with the participation of delegates of all stakeholders. Main issues cover legal, policies and planning aspects. At present the Commission has 14 members and their corresponding alternates delegates from all over the country (Caribbean and Pacific coasts). The stakeholders represented range from industrial and artisanal fishers, to seafood processing plants representatives, local and regional governments, the Police and the Navy, Sport fisheries and other authorities from the national government.

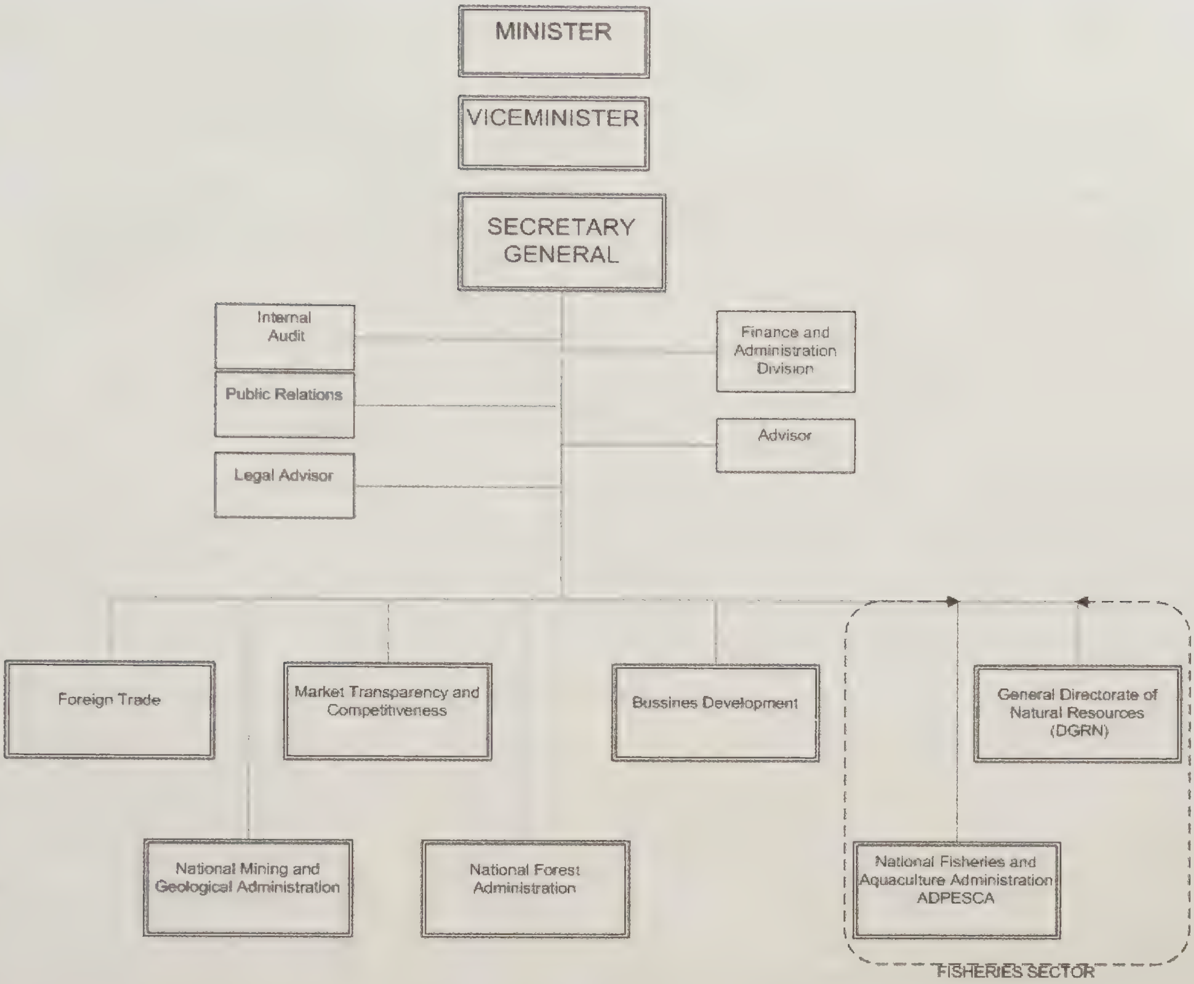
MINISTER
VICEMINISTER
SECRETARY GENERAL
Internal Audit
Public Relations
Legal Advisor
Finance and Administration Division
Advisor
Foreign Trade
Market Transparency and Competitiveness
Bussines Development
General Directorate of Natural Resources (DGRN)
National Mining and Geological Administration
National Forest Administration
National Fisheries and Aquaculture Administration ADPESCA
FISHERIES SECTOR

Figure 2: Current Organizational Chart of the Ministry of Development, Industry and Trade (MIFIC) of Nicaragua

The MIFIC, in coordination with the Ministry of Natural Resources and the Environment (MARENA) and consultation with the CONAPESCA, has also been mandated the development and publication of the Management Standards for Fisheries and Aquaculture. These standards describe all the technical standards and management tools with reference to harvesting methods, fishing gears, vessels, legal sizes, closed seasons and procedures and conduct codes.

According to Article 14 of the Fishery Law, fisheries research is carried out by ADPESCA, and ADPESCA has to draw a Fisheries and Aquaculture Research Plan, the result of which are to be the basis for technical recommendations and decision making in the fisheries management process. The law also mandates ADPESCA to gather all the necessary information and data to carry out stock assessments; to recommend management rules such as annual catch quotas, areas and time for closed seasons; fishing seasons; fishing areas; and the characteristics of fishing gears. The purpose is to assure that fisheries management is based on the best scientific evidence available and that the fishery resources are utilized in a sustainable way. Figure 3 shows a scheme of the organizational arrangements for fishery management in Nicaragua.

At present, fishery regulations in Nicaragua are set by the DGRN with the technical support and advice from ADPESCA. The rules are agreed upon with the stakeholders in the CONAPESCA meetings which are usually held 4 times a year. In the case of fully exploited Caribbean fisheries (e.g. Caribbean spiny lobster fishery), the rules concerning quotas and fishing effort levels must first be agreed upon with the Regional Autonomous Councils and Governments; then they can be submitted for consultation in the CONAPESCA meetings. After this process has finished, the proposed rule is sent by the DGRN to the MIFIC´s Ministry where the ministerial order is signed. Once the rules are published in the Official Gazette, the ADPESCA MCS Unit is in charge of enforcement, and implementation is carried out by the fisheries inspectors of the MCS Unit.

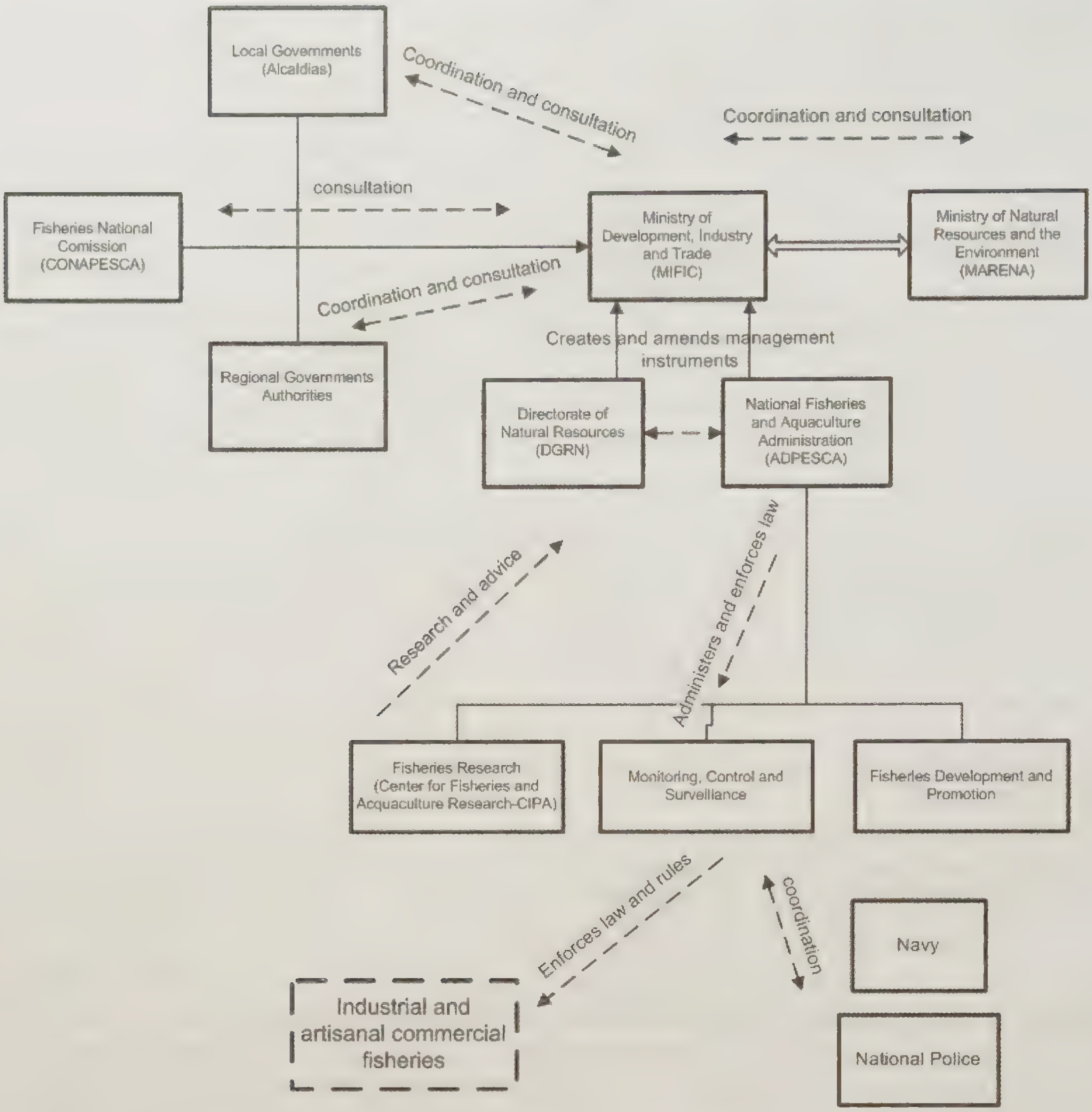
Local Governments (Alcaldias)
Coordination and consultation
Coordination and consultation
consultation
Fisheries National Comission (CONAPESCA)
Ministry of Development, Industry and Trade (MIFIC)
Ministry of Natural Resources and the Environment (MARENA)
Coordination and consultation
Creates and amends management instruments
Regional Governments Authorities
Directorate of Natural Resources (DGRN)
National Fisheries and Aquaculture Administration (ADPESCA)
Research and advice
Administers and enforces law
Fisheries Research (Center for Fisheries and Acquaculture Research-CIPA)
Monitoring, Control and Surveillance
Fisheries Development and Promotion
Enforces law and rules
coordination
Navy
Industrial and artisanal commercial fisheries
National Police

Figure 3: Schematic overview and organizational arrangements of the fishery management system in Nicaragua

Another important feature in the Fishery Law (Article 16) is that ADPESCA has to estimate an Allowable Biological Catch (ABC) based on the constant reference fishing mortality (F0.1) strategy throughout the different fishing seasons and for the fisheries declared as fully exploited. ABC is the basis for the technical recommendation of the AGCQ for the limited access fisheries (Caribbean spiny lobster and coastal shrimps) and the corresponding number of industrial vessels allowed to operate in each fishery. ADPESCA also has to monitor and make public the catch statistics related to the AGCQ, because a decision has to be made to determine when the AGCQ is attained and whether closing the fishery is necessary.

ADPESCA is also in charge of the monitoring, control and surveillance (MCS) of fisheries coordinated with MARENA, the Regional Governments in the Autonomous Regions (North Atlantic and South Atlantic Regional Governments in the Caribbean coast) and in collaboration with the National Police, the Navy, Customs, local Governments (Municipal Government) and any other required institutions.

As mentioned, in addition to ADPESCA´s authority, the Fishery Law confers authority to the General Directorate of Natural Resources (DGRN) of the MIFIC to coordinate the planning and development of the fishery policy as well as the development of the standards and rules for the appropriate management of the Nicaraguan fisheries in close cooperation with ADPESCA. The DRGN also creates, implements and administers fisheries management systems, adjusts management settings; and recommends amendments or additions to existing management systems. The DGRN is also in charge of the recording process and procedures for the licenses, permits and concessions in fisheries and aquaculture and the administration of the National Fisheries and Aquaculture Registry. Finally, the DGRN is not only in charge of administering the management of the fisheries and aquaculture, but also in charge of the management of the State owned mining resources, water and forests.

Other organizations that should coordinate with the MIFIC for the enforcement of the fishery law and the implementation of the fisheries management system include:

- The Navy: control and surveillance of Nicaraguan waters and marine territories, monitoring and control of the fishing fleets during closed seasons, control of the use of TEDs in the shrimp trawls, illegal fishing and transhipments;
- The Ministry of Natural Resources and the Environment: drawing up management plans in protected areas with fishery and aquaculture opportunities and the definition of closed seasons;
- The National Police: transport and terrestrial surveillance of illegal fishery products, support to fisheries inspectors when needed;
- Local governments (Municipalities or Alcaldías): decentralization of functions from the National Government regarding artisanal fisheries management: monitoring and control, artisanal fishery registry, issuing licences and permits, collection of fees;
- Regional Governments/Councils in the Caribbean Autonomous Regions: procedures for issuing fishing licences in the industrial fishery, coordination for research and setting rules;
- Ministry of Transport: safety regulations, navigational permits;
- Customs and General Internal Revenue Department;
- Labour Organizations;
- Ministry of Agriculture and Forestry: sanitation procedures and inspections; and
- Nicaraguan Institute of Tourism: sport fisheries

Although aquaculture is included in the mandates and functions of the MIFIC, in practice aquaculture research is not carried out by ADPESCA; rather it is carried out by local universities, e.g. the Agricultural University, the Central American University and the Ave Maria College.

4. ALLOCATION OF FUNDS TO FISHERY MANAGEMENT: THE BUDGET ALLOCATION PROCESS

4.1 Factors that determine the overall level of expenditures dedicated to a given fishery

The level of expenditures dedicated to any given Nicaraguan fishery is largely determined by the allocation and administration of the ADPESCA and DGRN budget in the MIFIC

The Executive Branch is responsible for developing and implementing the General Budget of the Republic (GBR) while the National Assembly (Legislative Branch) is responsible for the amendment and approval of the GBR. If the GBR is not approved, prior to the budget year in which it is to be implemented, the budget proposed by the Executive Branch is put into effect. The MIFIC budget is presented at the end of each year in a proposal to the Ministry of Finance[6]. The GBR does not, in practice, cover all central government expenditures, and earmarking is high. A portion of the foreign grants is not part of the GBR.

However, what it is reported by the MHCP does not necessarily represent what was spent in practice by the fishery institutions, and the actual expenditure from national treasury funds can be much less than the official figures reported as executed. In line with this, the level of expenditures also depends on the allocation and administration of the ADPESCA and DGRN budgets in the MIFIC by the General Administrative and Finance Division (DAF).

In general, there is no feedback and track of the expenditures by the ADPESCA and DGRN and the DAF. An International Monetary Fund report (IMF, 2002) pointed out that the organizational classification in the GBR at the ministerial level does not identify the different administrative units, within the ministries, responsible for implementing the different spending programmes. This obviously hinders the process of assigning responsibility for the collection and use of public funds.

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[6] Budget allocation for each institution is disaggregated by program. For each program information is provided on aggregate current spending and aggregate capital spending, physical goals and investment projects indicating in each one, its source of financing: the treasury, foreign donations/loans.

ADPESCA develops annual work plans with budgets which are never fully allocated by the DAF, thus making it difficult to implement and accomplish activities as planned. An exception occurs if there is funding available from donor or international projects for specific programmes.

4.1.1 The importance of the fishery and status of the resources

Most of the budget allocated by the DAF goes to the management services of the most important fisheries under limited access and which are regarded as fully exploited, i.e. the industrial Caribbean spiny lobster and coastal shrimp fisheries. The stock assessment relies on fishery dependent data. Updated fishery independent data is difficult to obtain due to the lack of funds and staff available. Open access fisheries are not given appropriate fisheries management services, and very little research is carried out on the status of the stocks in order to provide management recommendations.

4.1.2 Staff available in the ADPESCA and DGRN

The level of expenditures defines also the staff available given that budget reductions through the 1990s and 2000s resulted in the reduction of personnel. At present, only 38 people are working for ADPESCA and 12 people in the DGRN (Table 7).

For example, there are only 14 fishery inspectors in the country, thus making the tasks associated with an efficient service on monitoring, control and surveillance of the different fisheries essentially impossible. Also the 9 fishery researchers ascribed at the CIPA cannot cope with the research needs and responsibilities regarding fishery management.

4.1.3 Unplanned activities

Part of the fisheries management budget is used for unforeseen activities such as research programmes on new fish resources of potential importance, sudden fishery issues raised by the same fishing industry or new investors, pressures from other government institutions and even the general public and nongovernmental organizations.

Table 7: Number of employees in the National Fisheries and Aquaculture Administration (ADPESCA) and the General Directorate of Natural Resources (DGRN) in 2004

ADPESCA Unit	Technical Staff	Support staff	Total	DGRN Unit	Technical Staff	Support Staff	Total
General Manager	2	2	4	General Manager	2	2	4
Monitoring, control and surveillance	14	1	15	Policies and Standards	2		2
Fisheries development and Promotion	7	1	8	Administration of Concessions	1		1
Fisheries Research	9	2	11	Official Register	3		3
				Documents and procedures	2		2
Total	**32**	**6**	**38**		**10**	**2**	**12**

4.2 Role played by individuals outside the fisheries management agency in the budget allocation process

There are no individuals, belonging or related to the fisheries sector, outside the fisheries management agencies in the budget allocation process. However, some direct funding from private companies and entrepreneurs is provided for some specific activities, e.g. research programmes on new fisheries.

4.3 Formal evaluations of expenditures and process for budget adjustments

Budget adjustments and evaluations are usually carried out without the participation of the fisheries management agencies. In general the DAF of the MIFIC carries out the administration of the funds available according to its own criteria. As mentioned, no feedback and detailed information on the execution of the budget is provided to the ADPESCA and the DGRN on a regular basis.

5. SUMMARY OF EXPENDITURES

The organizational classification in the General Budget of the Republic at the ministerial level does not identify the different administrative units within the ministries responsible for implementing the different spending programmes and the amount of money allocated. Control of the expenditures of the different MIFIC administrative units is carried out by the General Financial and Administrative Division (DAF). However, in practice there are no financial statements of the MIFIC available for public consultation. The only way to have a rough idea of what is spent each year by the different administrative units in the MIFIC is to look up in the final statements made by the Ministry of Finance on the execution of the GBR. Furthermore, this has only become available recently (i.e. as of 2002); before 2002 the final financial statements were very general. Nonetheless, it was possible to obtain financial data from the DAF of the MIFIC to categorize the expenditures of the ADPESCA and the DGRN by administrative units in the period 2002–2004. Table 8 shows a summary of the general expenditures, including funding from foreign aid projects.

According to Table 8 the MIFIC has spent a total of about US$8 million per annum from 2002 to 2004; however, the DGRN and ADPESCA budgets from the national treasury have been in the order of US$170–200 thousand and US$400–500 thousand respectively. (The DGRN budget has always been less than that of the ADPESCA.) These budget are about 0.5 percent of the value of the fishery exports.

Foreign aid funds have been important in the overall expenditures for fishery management, and they represented about 30 percent of the total in 2003 and 2004, and the amount spent is equivalent to the DGRN budget (Figure 4). From the total budget of the MIFIC, less than 10 percent is spent by ADPESCA and the DGRN (Figure 5).

Table 8: Final expenditures (US$) from National Treasury funds of the MIFIC, ADPESCA and the DGRN by administrative units and from foreign aid funds, with total exports in US$ and tonnes, 2002–2004.

	2002	2003	2004
MIFIC (total)	7 797 534	6 752 436	8 044 023
DGRN	194 105	211 275	169 991
Policies and Standards	123 351	131 189	97 325
Administration of concessions	70 753	80 086	72 666
ADPESCA	517 991	435 248	512 069
Monitoring, control and surveillance	216 050	188 123	192 840
Fisheries Development	114 091	42 400	45 040
Fisheries Research	187 850	204 725	274 189
FOREIGN FUNDS	128 923	286 484	244 616
PASMA–DANIDA (Denmark)	38 875	93 845	125 390
AECI (Spain)	51 620	65 049	89 226
DIPARAAN–JICA (Japan)	16 428	103 420	
Other (Spain, Sweden)	22 000	24 169	30 000
FISHERY EXPORTS in US$	94 318 000	87 854 000	96 728 000
FISHERY EXPORTS in tonnes	9 910	11 042	13 015

Source: DAF–MIFIC, DGRN and APDESCA

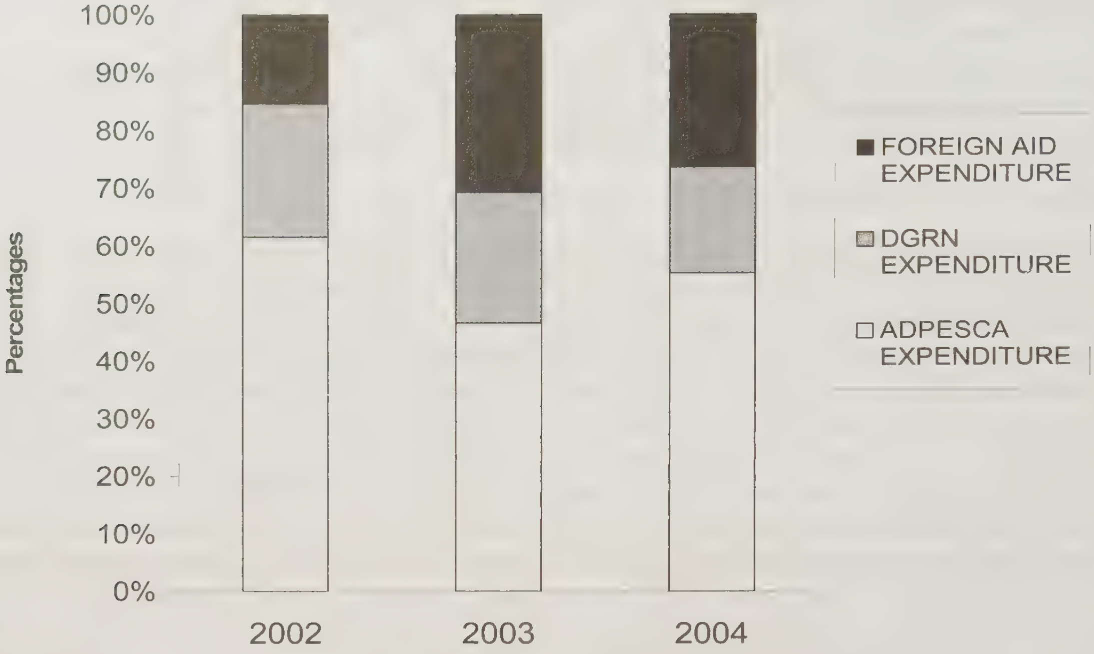

Figure 4: Expenditures in percentages of ADPESCA, DGRN and foreign aid in fishery management

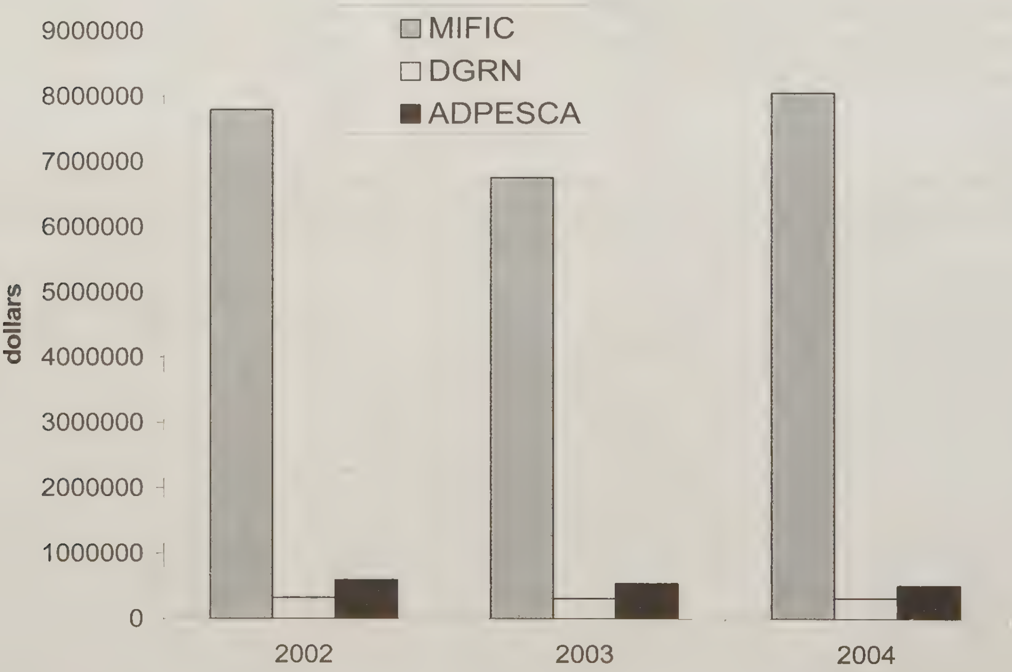

Figure 5: Comparison of the ADPESCA and DGRN budgets in US dollars in relation to the MIFIC budget in 2002 to 2004.

Using the data presented in Table 8, Figure 6 shows the proportion of the expenditures by administrative units in ADPESCA and the DGRN. In the case of the DGRN there is an important and growing contribution from the Danish funded programme (PASMA–DANIDA) which totalled almost 50 percent of the budget spent at the DGRN in 2004. In the case of ADPESCA it is significant to point out that the Fisheries Development and Promotion unit is the one with the smallest level of expenditure and budget.

5.1 Expenditures categorization

5.1.1 Scientific research

This is carried out by the Center for Fisheries and Aquaculture Research (CIPA) under the ADPESCA. At present all the scientific research (data analysis and stock assessment) relies on fishery-dependent data (i.e. reported landings by commercial categories and processing data from seafood processing plants, biological data describing the animals landed). These data are used to carry out stock assessments and computation of the ABC for the Caribbean spiny lobster and coastal shrimps through tuned length cohort analysis and catch projections. At present 100 percent of the budget for CIPA comes from the National Treasury. However, research on particular fisheries has been carried out with the support of foreign aid projects in cooperation with the Fisheries and Aquaculture Development and Promotion Unit of the ADPESCA. There are negotiations with international donors to develop further support to research programmes as of 2006.

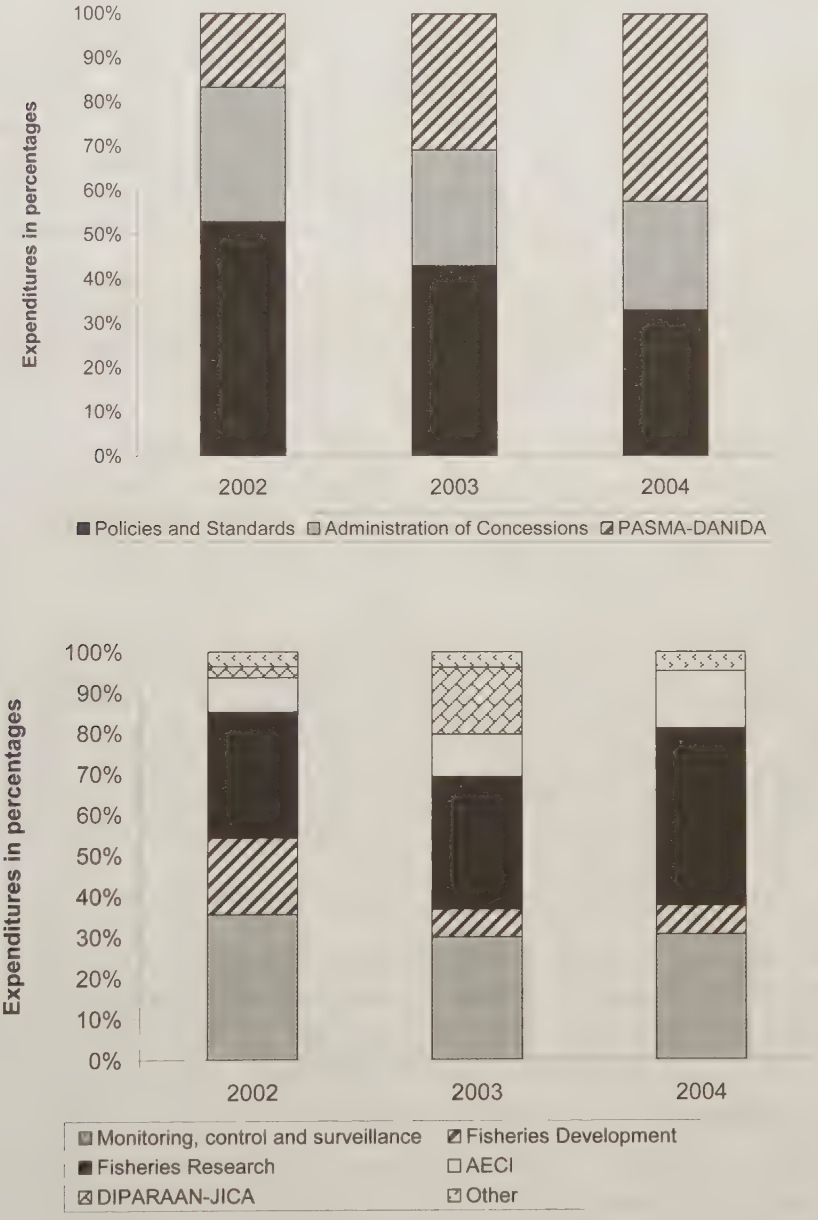

Figure 6: Expenditures (percentages) of the DGRN (upper) and ADPESCA (lower) by administrative units and foreign aid funded projects/programmes

5.1.2 Policy Development and Operational Management

The DGRN is in charge of policy development and operational management. (As mentioned previously, in addition to fisheries this administrative unit of the MIFIC is also in charge of these issues for mining, water and forests in national lands management.) The DGRN has a Policies and Standards Directorate where all fisheries and aquaculture policies are developed with the cooperation of ADPESCA. Another Directorate (Concessions) is in charge of issuing licenses, permits and concessions and the National Fisheries and Aquaculture Register.

The DGRN operates with funds from the National Treasury but the main source of funding is becoming the Danish supported programme named PASMA–DANIDA (Environmental Sector Support Programme) which is shared with other 2 governmental organizations (the Ministry of the Environment and Natural Resources, and the Nicaraguan Institute for Territorial Studies).

5.1.3 Enforcement

Enforcement of the rules is in charge of ADPESCA through de Monitoring, Control and Surveillance (MCS) Unit. Fisheries inspectors carry out the MCS activities on land (seafood processing plants, markets, airports, and customs). Cooperation agreements exist with the National Police and the Navy in supporting some MCS procedures, especially surveillance at sea regarding the use of TEDs and the implementation of closed seasons. However, this is the weakest fishery service provided by ADPESCA since there are 10 fisheries inspectors located at the main landing sites: Corn Island, Bluefields and Puerto Cabezas in the Caribbean coast; and San Juan del Sur and Chinandega in the Pacific coast. The other three inspectors are located in Managua, the capital city, one at the International Airport and two in the central offices of ADPESCA.

Surveillance at sea is carried out by the Navy but is an activity that is not done on a regular basis due to the Navy scarce budgets. No aerial surveillance is carried out. The fishery law mandates the implementation of a satellite based vessel tracking and monitoring system to be implemented on an annual basis (since December 2004) for all industrial vessels operating in the Caribbean spiny lobster and shrimp fisheries.

5.1.4 Corporate and Administrative Support

Cross cutting issues in ADPESCA and the DGRN are handled by the one legal advisor in the DGRN who is also in charge of all legal issues concerning fisheries, mining and water management. ADPESCA has no legal department. Educational- and publicity-related matters are usually financed by foreign programmes/projects.

Table 9 shows the expenditures by fishery services in Nicaragua: research, management, and monitoring, control and surveillance from the data available for year 2002, 2003 and 2004 reported in the DAF financial statements on the expenditures in the MIFIC budget. The expenditure data for each fishery management service was aggregated according to the administrative units in ADPESCA and the DGRN.

Total costs of the fisheries management services each year have been in the order of US$600 thousand in the period 2002–2004 with a small level of increase since 2002 (Table 9). This amount is in contrast with the value of the fishery exports shown in the last row of Table 9.

Table 9: Estimated costs (in US$) of the fishery management services in Nicaragua from ADPESCA and DGRN budgets (foreign programmes/funds excluded in the analysis) 2002–2004.

Category of Expenditure	**2002**	**2003**	**2004**
Research	187 850	204 725	274 189
Monitoring, control and surveillance	216 050	188 123	192 840
Management	194 105	211 275	169 991
Total fisheries management services	598 005	604 123	637 021
Catch value[7]	9 4318 000	87 854 000	96 728 000

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[7] In the Nicaraguan context the landed catch value has been assumed to be the value of the fish exports as about 90 percent of the main fisheries landings are exported.

On average research expenditures account for 37 percent of the total fishery management service expenditures, followed by monitoring, control and surveillance with 32 percent. Management expenditures amount to 31 percent (Figure 7).

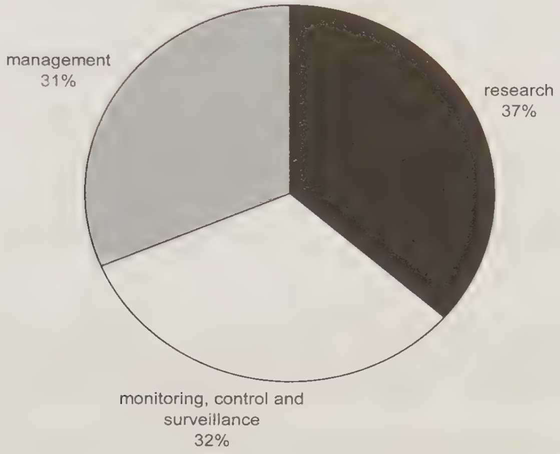

Figure 7: Proportion of the fishery management services expenditures in Nicaragua as an average for the period 2002–2004. (Funds from international donors/programmes excluded from the analysis.)

5.2 Approaches used by the agency to track expenditures

The administration of the MIFIC budget is centralized under the Financial and Administrative Division. In general, there is no formal process to track down expenditures as long as there are no regular and year-end accounting reports on the execution of the annual budget. Statistics presented on expenditures are not always reliable. Even the annual budget allocated is not available to the public. The current general manager of this Division is sending regular reports on the expenditures of each administrative unit of the MIFIC via electronic mail. However, the statements only refer to the amount paid in salaries and other general items. The reports are not categorized according to the fishery management services delivered and no comparison with initial planned budget predictions can be made. No information is submitted on the implementation of budget programmes by administrative units or on the extent to which their objectives have been achieved. In some cases foreign technical assistance agencies channel and control their financial resources by their own procedures outside the GBR or the MIFIC budget.

6. ANALYSIS OF FINANCIAL INFORMATION AND PRESENTATION OF FINANCIAL INDICATORS

6.1 Effectiveness and efficiency of expenditures on key fisheries management activities

For the case of Nicaragua, the ratio of expenditures of fisheries management costs versus the value of the exports is extremely low reaching on average 0.66 percent of the fishery exports (Table 10). The level of expenditures in each fishery service is about 0.2 percent.

These indicators show that the Government investment, excluding foreign aid programmes/projects, is not enough to carry out fishery management services in an effective and efficient way. Most of the funds allocated are to pay salaries and per diems, and running costs such as water, electricity and telephone bills, maintenance of the premises, etc. At present most of the expenditures on key fishery management activities are being done through budget provided by foreign aid programmes.

All the values presented in Table 10 are low if compared with the estimates for other fisheries in the world. For example, Willmann *et al.* (2000) pointed out that total government expenditures for fisheries management in Thailand fisheries amounted to just above 1.6 percent of the total gross revenues of marine fish landings. Arnason *et al.* (2000) estimated ratios ranging between 3 percent in Iceland, 8 percent in Norway and 20 percent in the Province of Newfoundland, Canada (Shrank and Sokoda, 1999), and Cox (2002) estimated expenditures on the order of 7.2 percent in the Commonwealth fisheries of Australia (Cox, 2002).

Table 10: Ratio of the government expenditures for fisheries management in relation to the value of the catch landed in Nicaragua

	2002	2003	2004	average
	percentages			
Research	0.20	0.23	0.28	0.24
Monitoring, control & surveillance	0.23	0.21	0.20	0.21
Management	0.21	0.24	0.18	0.21
TOTAL fisheries management services	0.63	0.69	0.66	0.66

Table 11 shows some indicators of fisheries management services costs in Nicaragua in relation to the coastline (km), number of fishers, weight of the fishery exports (ton), number of industrial and artisanal vessels and boats, area of the continental shelf (km^2) and the value of the fishery exports (in US$).

The highest expenditure in each fishery service is related to the cost related to the industrial fleet (US$/vessel) which ranges from US$1 746 per vessel (research service) to US$1 083 per vessel in the management service. In all fishery services, the lowest expenditures are related to the continental shelf area (from US$3 to US$5 per km2) and the value of the fishery exports (US$0.002–US$0.003 per US$1).

Table 11: Indicators of fishery management services expenditures in Nicaragua (2004)

	Fishery Management Services			
Cost in relation to	**Research costs**	**Monitoring, control and surveillance costs**	**Management costs**	**TOTAL**
coast line (us$/km)	291	205	181	677
number of fishers (US$/fisher)	17	12	10	39
Ton (US$/tonne)	21	15	13	49
industrial fleet (US$/vessel)	1746	1228	1083	4057
artisanal fleet (US$/boat)	65	46	41	152
continental shelf (US$/km^2)	5	3	3	11
Value of exports (US$/1US$)	0.003	0.002	0.002	0.007

Other analyses regarding investment on fisheries management in Nicaragua (Ehrhardt, 2000; 2003 and 2004) show that in the last 12 years the ADPESCA budget decreased significantly showing a trend that is inversely correlated with the fishery exports (Figure 8). Figure 8 shows that the ADPESCA budget in 1993 was almost US$2.5 million when fishery exports were in the order of US$30 million while in the last four years both fishery exports and the ADPESCA budget stabilized at about US$95 million and US$0.5 million respectively. Noticeably, fishery exports do not show a significantly increasing trend since 1995 with the exception of a peak in 2000 (Figure 8). Figure 9 shows the relation between the ratio of the ADPESCA budget in relation to fishery exports where a substantial decrease from more than 7 percent in 1993 to about 0.5 percent in the last 5 years is observed.

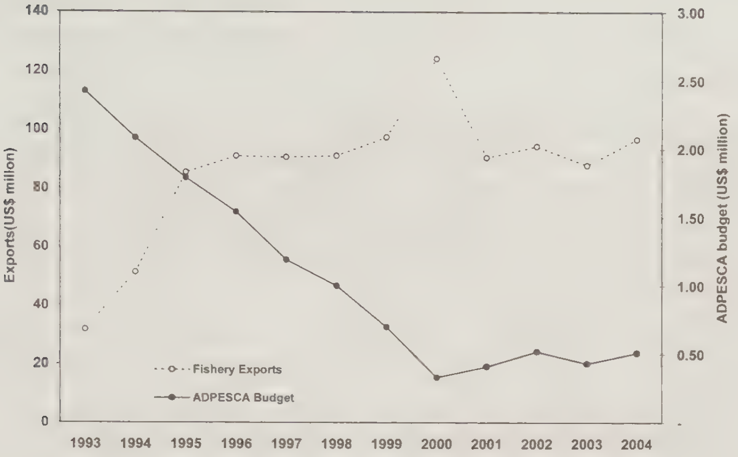

Figure 8: Fishery exports and National Fisheries and Aquaculture Administration annual budget, 1993–2004. (Modified from Ehrhardt, 2004)

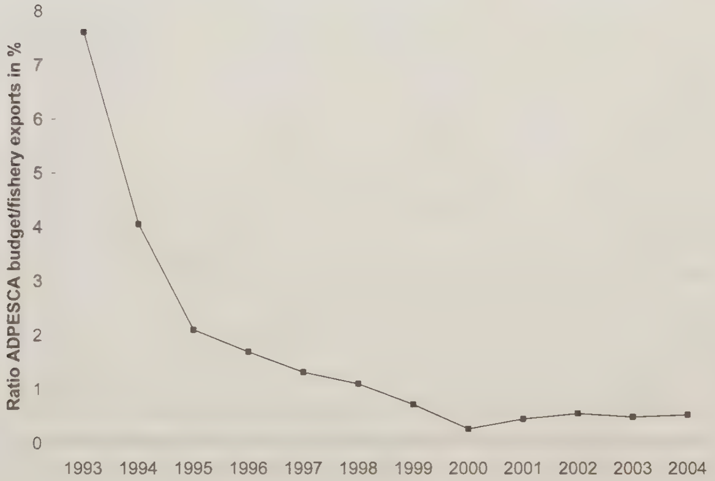

Figure 9: Ratio in percentage of the ADPESCA budget in relation to fishery exports. Nicaragua, 1993-2004 (Modified from Ehrhardt, 2003)

Data available from 1996 to 2002 from Ehrhardt (2003) indicate that the ADPESCA experienced a significant decline in the application of penalties for not complying with fishery regulations (Figure 10) which could be an index of the inefficiency of the activities of the fisheries inspectors and of the decisions made in ADPESCA regarding the validity of the infractions.

This is relevant considering the low compliance levels in most of the Nicaraguan fisheries[8] which, in turn, affect the implementation of an efficient cost recovery system. Fines and charges defined in the new Fishery Law are considerable and, if properly used and managed, could contribute enough funds to better implement the fisheries management services in support of the sustainability of the fisheries.

Table 12 shows the results of a preliminary financial exercise from 2004 CIPA data (César Rivera, pers.comm.) carried out to estimate and compare the potential government revenues from user and access rights fees in the Caribbean spiny lobster and shrimp industrial fisheries versus the reimbursement to be made by the Government for the tax exemptions for the use of fuel in the fishery operations (based on the average fuel consumption in gallons per day). A description of fishery tax exemptions and fishery fees can be found below in Chapter 7.

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[8] One exception is made in 2004 when a substantial fine of US$250 thousand was imposed on a Nicaraguan exporter by a U.S.A. Court for trading undersized Caribbean spiny lobster in Florida. The money from this fine is being used to support MCS during Caribbean spiny lobster closed seasons and to implement the satellite based industrial vessels tracking and monitoring system.

The highest total Government's estimated revenues in 2004 (5th column in Table 12) were in the Caribbean spiny lobster fishery (US$195 thousand in the trap fishery and US$160 thousand in the diving fishery) and in the Caribbean coastal shrimp fishery (about US$158 thousand). In 2004, the total Government's revenues were in the order of US$571 thousand. However, the same fisheries are the ones with the highest amount of money to be reimbursed from fuel tax exemptions (10th column in Table 12).

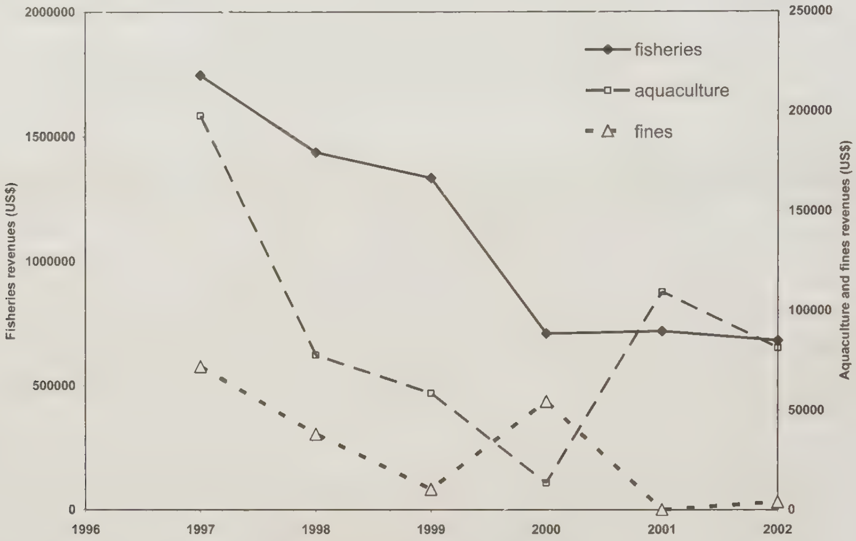

Figure 10: Revenues from aquaculture and fisheries, and revenues from fines in US$. 1996–2002 (from Ehrhardt, 2003)

According to Table 12, in 2004 the total negative balance (last column of Table 12) for the Nicaraguan Government was in the order of US$2 million. Other conclusions that can be drawn from Table 12 are that in the Pacific deep water shrimp fishery the reimbursement paid by the Government is 13 times higher than the revenues obtained while in the Caribbean spiny lobster diving fishery is only 0.8 times.

As a general result, this financial exercise suggests that financing fisheries management in Nicaragua with cost recovery systems with revenues from fishery fees is not possible under the current tax exemption system for fuel use in fishery operations.

Following the previous analysis, Table 13 shows actual 2005 revenue data from use and access rights fees to be allocated according to the new Fishery Law. Details on the allocation of funds are presented below in Section 7. It should be noted that no funds from the most important fisheries (the Caribbean spiny lobster and Caribbean coastal shrimp) will be allocated to the Fisheries Development Fund. Instead, a significant fraction of the Central Government share of the revenues is to be allocated to the local and regional Governments.

In the first quarter of 2005 no revenues were reported from fishery activities in the Pacific coast while 71 percent of the revenues came from the Caribbean fisheries (Table 13). In total, only 11 percent (US$16 785) of the total revenues is allocated to the Fisheries Development Fund. This has a high impact on fishery management activities since the Local/Regional Governments lack of scientific and technical capabilities to provide fishery services. This situation is out of control of the ADPESCA and the DGRN and it is not strategic or efficient to dilute the funds into many peripheral institutions. There is also no guarantee that the funds allocated to the National Treasury will be reinvested in the fishery sector.

Table 12: Comparison of the estimated Government's revenues from use and access rights fees in industrial crustacean fisheries versus the reimbursement to be made for fuel consumption for tax exemption (Average data, January–December 2004).

	Caribbean coastal shrimp fishery		**Pacific Coast coastal shrimp fishery**	**Pacific Coast deep water shrimp fishery**	**Caribbean spiny lobster fishery**		**TOTAL**
	shrimp tails	whole shrimp	shrimp tails	shrimp tails	traps	diving	
Recorded landings in pounds	2 982 691	775 642	390 892	199 580	672 018	614 740	
Estimated Government revenues							
from user rights fees (US$)	140 261	24 084	18 382	0	158 764	145 232	**486 723**
from access rights fees (US$)	17 600	4 400	6 400	4 400	36 600	15 600	**85 000**
Total Government Revenue	157 861	28 484	24 782	4 400	195 364	160 832	**571 723**
Days at sea	10 903	2 443	1 643	565	12 199	3 688	
Average gallons of fuel per day	224	224	200	200	190	190	
Total fuel consumption	2 442 272	547 232	328 600	113 000	2 317 810	700 720	
US$/gallon exemption	0.4092	0.4092	0.5415	0.5415	0.4092	0.4092	
Amount in US$ to be reimbursed	999 378	223 927	177 937	61 190	948 448	286 735	**2 697 614**
Balance: revenues - reimbursement	-841 517	-195 444	-153 155	-56 790	-753 084	-125 902	**2 125 891**

The findings shown above indicate that the Nicaraguan government is not capturing the rent from fishery resources in an efficient and appropriate way and, as a consequence, it is gradually decreasing its economic capacities to adequately finance fisheries management. The fishing industry is, in fact, subsidized by the government because what the government recovers under the present cost recovery mechanisms is much less than the government provides to the industry. This situation contradicts the fact that the Nicaraguan State, as owner of the fish resources, requires to control fisheries development to enhance the economic and social impact of the use of the national fishery resources. This has not allowed the proper development of fisheries management services, and particularly those regarding monitoring, control and surveillance, resulting in insufficient adherence to fishery regulations by the users and overcapitalization of the system.

Table 13: Actual data on monthly allocation of revenues (in US$) from access and use rights fees according to the percentages established in the new Fishery Law (First quarter, 2005).

	Percent	**01– 31/01/05**	**01– 28/02/05**	**01–31/03/05**	**TOTAL COLLECTED**
PACIFIC COAST					
Fisheries development fund	50				0
Local governments (Alcaldías)	35				0
National Treasury	15				0
Sub-total Pacific coast		0	0	0	0
AQUACULTURE					
Fisheries development fund	40	7 768	0	9 017	16 785
Local governments (Alcaldías)	40	7 768	0	9 017	16 785
National Treasury	20	3 884	0	4 508	8 392
Sub-total aquaculture		19 420	0	22 542	41 962

	Percent	01– 31/01/05	01– 28/02/05	01–31/03/05	TOTAL COLLECTED
CARIBBEAN COAST					
Indigenous Communities	25	8 521	7 681	9 853	26 055
Local governments (Alcaldías)	25	8 521	7 681	9 853	26 055
Regional Governments and Councils	25	8 521	7 681	9 853	26 055
National Treasury	25	8 521	7 681	9 853	26 055
Sub-total Caribbean coast		34 084	30 724	39 412	104 220
TOTAL		**53 504**	**30 724**	**61 953**	**146 182**
Total Allocation to the Fisheries Development Fund			**16 785**		
Total Allocation to the Local Governments			**42 840**		
Total Allocation to the National Treasury			**34 447**		

Source: DGRN

7. SOURCE OF FUNDING

The new Fishery Law in its Article 106 mandates that all revenues obtained from access and use rights fees from fishing licenses, permits and aquaculture concessions; fines, auctions, donations and any other sources of income, domestic or international, will be allocated to a Fisheries Development Fund specifically created by the new Law. The Fund will then finance all fisheries management services: research, management and enforcement. However, the procedures and administration of the Fund are yet to be implemented. Nevertheless, Article 108 of the new Law expresses that not all revenues from access and use rights fees from fishing licenses, permits and aquaculture concessions will be entirely allocated to the Fisheries Development Fund.

In fact, some of the revenues from these sources of income are also to be allocated to local and regional governments, to Caribbean indigenous communities and to the National Treasury according specified terms. The allocation will be carried out by the General Treasury Department of the Ministry of Finance according to the percentages shown in Tables 13 and 14. The allocation has also been divided by geographical areas: Caribbean coast (North and South Atlantic Autonomous Regions), the rest of the country and the areas where aquaculture operations are taking place. Hence, the two Articles of the Law appear to contradict themselves, and the consequences of distributing the rent obtained from fisheries among several governmental institutions does not contribute to the enhancement of the fishery management controls that the Government needs to impose on the users of the resources.

The money allocated to local and regional governments are for fisheries development activities such as infrastructure construction and rehabilitation, e.g. wharfs, dams, shipyards, and any other intended to strengthen fisheries development. The use of the funds is to be under the supervision of the Ministry of Finance, the regional authorities and audited by the Government oversight body, the Office of the Comptrollers General of the Republic. It should be noted again that the most valuable fisheries are in the Caribbean coast, but no money is to be allocated to the Fisheries Development Fund derived from fishery resources use and access fees recuperated from these regional fisheries.

Table 14: Percentages of allocation of fisheries and aquaculture revenues from fisheries access and use rights fees as mandated in the Fishery Law of 2004

Area	Percent
CARIBBEAN COAST	
Indigenous communities	25
Local Governments	25
Regional Governments and Councils	25
National Treasury	25

Area	Percent
REST OF THE COUNTRY	
Fisheries Development Fund	50
Local governments	35
National Treasury	15
AQUACULTURE AREAS	
Fisheries Development Fund	40
Local governments	40
National Treasury	20

The Fishery Law endorses what it was established in Articles 103 and 104 of the Fiscal Fairness Law (Law 453) published in the Official Gazette 82 of the 6th of May 2003 regarding the payment of fees for access and use rights in fisheries and aquaculture. Fees were defined by the Ministry of Development, Industry and Trade (MIFIC) and the Ministry of Finance and Public Credit (MHCP). The General Internal Revenue Department (DGI) of the Ministry of Finance is in charge of collecting the fees[9].

7.1 Fisheries Access Rights Fees

In Nicaragua the fishery access rights fees are paid in US dollars or in the domestic currency (Córdoba) at the official exchange rate with respect to the US dollar the day of payment according to: an annual fixed rate per feet of vessel length in the case of the industrial and sport fisheries; a fixed annual fee for the industrial fishery storing centers; and an annual fixed rate per hectare in aquaculture and per boat in the artisanal fisheries. Artisanal storing centers and scientific fisheries are tax free (Table 15).

A distinction should be made between a fishing license and a fishing permit. A fishing licence is a document issued by the fishery authority that allows a person or a legal entity that owns a fishing craft to harvest fishery resources, while a fishing permit allows a person or a legal entity to carry out smallscale commercial fishing, to have artisanal storing centers or to carry out scientific or sport fishing for noncommercial purposes.

Table 15: Fees for access rights in fisheries and aquaculture in Nicaragua

Annual access rights fees in fisheries and aquaculture	
a. For each industrial fishing license by vessel:	
1. Lobster	US$30 per feet of vessel length
2. Shrimp	US$20 per feet of vessel length
3. Finfish	US$10 per feet of vessel length
4. Other	US$10 per feet of vessel length
b. For each storing center of other coastal marine and freshwater resources	US$500, artisanal storing centers are tax free
c. For each sport fishing permit	US$5.00 per feet of boat length
d. For each land, bottom or water hectare under concession	US$10.00
e. For each artisanal fishing permit	US$5.00 per boat. Payment should be made in the Alcaldías (Municipality)
f. For each scientific fishing permit	Tax exemption

7.2 Fisheries Use Rights Fees

All fishing licenses, fishing permits and aquaculture concessions holders exploiting any fishery resource must pay use rights fees on an annual basis. The payment is made to the General Internal Revenue

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[9] In general, taxes are paid by the fishers when selling their product to a seafood processing company (Companies are authorized to collect taxes from fishers). The total final amount paid to the fisher has then already a deduction of 1 percent (sales municipal tax), 2.25 percent (use rights fee), 2 percent (income tax) plus a charge of 5 percent for the weight loss of the product.

Department of the Ministry of Finance either in US dollars or in Córdobas at the official exchange rate the day of payment. The fees rates are the following:

a) Traditional Products: Coastal shrimp and Spiny lobster: 2.25 percent of the value of the landings or production of the shrimp farms;

b) Non Traditional Products[10]: tax free the fist three years (2004–2006). From 2007 onwards: 1 percent of the value of the landings or production; and

c) Finfish artisanal fisheries: tax free the fist three years (2004–2006). From 2007 onwards: 0.5 percent of the value of the landings.

The value of the fishery landings and farmed shrimp production per unit of weight is revised and defined by the MIFIC every 6 months according to the average price in the market and, by ministerial decree, is issued and published.

Long-range tuna fisheries are considered under a special access and tax regulation system defined in an Executive Decree (Executive Decree 40–2005). Fees are paid on an annual basis according the nationality and the net tonnage of the vessel, and the place the catch is landed. This is done according to the following criteria:

Nicaraguan Flagged Fishing vessels:

- US$50 per ton of net register of the vessel or the equivalent amount in Córdobas at the official exchange rate the day of payment if the catch is not landed in Nicaragua;
- US$20 per ton of net register of the vessel or the equivalent amount in Córdobas at the official exchange rate the day of payment if the catch is landed in Nicaragua; and
- Tax free if the catch is landed and processed in the country.

International Fishing vessels:

- US$70 per ton of net register of the vessel or the equivalent amount in Córdobas at the official exchange rate the day of payment if the catch is not landed in Nicaragua; and
- US$20 per ton of net register of the vessel or the equivalent amount in Córdobas at the official exchange rate the day of payment if the catch is landed and processed in Nicaragua.

7.3 Other fiscal charges in Nicaragua

They include national taxes such as the Income tax (IR), Value Added tax (IVA), Excise tax (IEC) and Customs tax (DAI). Municipal taxes include Sales tax and Real State tax. However, they are not described in this document due to the complexity of the system and the lack of data available.

8. INCENTIVES ("SUBSIDIES") TO THE FISHERY SECTOR

A seafood export Company with a minimum of US$50 000/year in exports has the following incentives:

- Accelerated depreciation of the capital goods;
- DAI and IVA exemptions for supplies, raw material, spare parts and equipment directly utilized in the production process of the export goods;
- Fiscal credit equivalent to 1 percent of the FOB value of the exports; and
- Fishery fees can be paid back with the fiscal credit.

Industrial and artisanal fishing and aquaculture companies are IEC exempted for the purchasing of diesel and gasoline in Nicaragua if utilized in export-oriented fishing or aquaculture operations. The beneficiaries are paid back by the Government US$0.4092 per gallon (in the Caribbean coast) and US$0.5415 per gallon in the Pacific coast and inland waters. These data were the basis for the calculations of the financial exercise presented in Table 12 above.

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[10] This category includes all fishery and aquaculture products not included in a) or c).

In Nicaragua these incentives are highly demanded because they are effective palliative measures in the short term for most users. However, in the medium term they do not solve the economic problem, for which they were originally intended – keeping income from fisheries sustainable. This type of measure is easy (but costly) to apply, but it is politically difficult to withdraw if the economic problems of the fishery sector has not been solved or because of the political pressure exerted by some organized groups of fishery users.

9. OTHER ISSUES

9.1 Use of nongovernment funds

At present most of the expenditures on key fisheries management activities are being done through budget provided by foreign aid programmes. The best example is the PASMA–DANIDA programme implemented in the DGRN where several national and international consultancies have been carried out on several key issues for fisheries management:

- Development of sustainability criteria for Nicaraguan spiny lobster and shrimp fisheries;
- Development of the stock assessment method for the computation of the ABC for spiny lobster and coastal shrimp fisheries;
- Bioeconomic Assessment of the impact of fishing undersized spiny lobster in the Caribbean Nicaraguan;
- Design of the monitoring, control and surveillance system;
- Design and implementation of a new statistical database for fisheries and aquaculture with computer based routines for collection and data processing;
- Design and implementation of a new statistical database with computer based routines for collection and data processing to compute the payment of use and access rights fees in fisheries and aquaculture;
- Planning and administration of aquaculture concessions;
- Training on monitoring and control procedures for the fisheries inspectors;
- Fisheries and aquaculture regulations; and
- Management plans for artisanal fisheries.

The results of these consultancies have been used to set the current general legal and fisheries management framework in Nicaragua. For example, Nicaragua is very well advanced in stock assessment methodologies for the computation of the ABC which are used to set the TAC in the fully exploited fisheries. It has also contributed to set the computer based fishery statistical databases used in the country and new approaches for carrying out the monitoring, control and surveillance yet to be implemented.

For a five year period that ends in 2005 the total amount of money spent by the PASMA programme in the MIFIC was in the order of US$500 thousand out of a total of about US$30 million invested in the country. This is a great achievement for the MIFIC and it is considered an efficient use of the PASMA–DANIDA budget by the Danish Government. A second phase of PASMA (2006–2010) has already been negotiated for an amount of US$1.6 million.

In the ADPESCA, the Spanish Agency for Development Cooperation (AECI) has contributed to develop artisanal fisheries in the northern coast of Lake Nicaragua under an artisanal fisheries management plan. It has also contributed in the organization of fishers and, most significantly, in the decentralization process of management and monitoring, control and surveillance services functions to the local governments with particular reference to artisanal fisheries. The total budget of this project for a 3 year period is US$300 thousand. The AECI programme has also contributed with a US$35 thousand to the research programme in 2005 whose results will be the input to develop fishery regulations in Lake Nicaragua.

At present, the Government has given high priority to use the money generated from a fine imposed by a USA Court to a Nicaraguan exporter (trade of undersized Caribbean spiny lobster). The money was transferred to the MIFIC from the United States and it will be used to finance the satellite based monitoring system for all industrial vessels with fishing licences in Nicaragua. The fine has also financed the control and monitoring during the closed seasons for lobster and coastal shrimp.

In some special cases, nongovernmental funds for fisheries management have been provided by local entrepreneurs, e.g. retrieval of illegal lobster traps during closed seasons, research on some specific fish species.

9.2 Cost recovery mechanisms

The cost recovery system established in the new Fishery Law through the creation of the Fisheries Development Fund has not yet been implemented. The purpose for the use of the money is clearly established: implementation of fishery management services, but the level of cost recovery will be low under the current incentives system for the fishery sector and the allocation of money from fishery fees to several peripheral institutions.

If it is assumed that the level of cost recovery should be in the order of 2 percent of the value of the fishery landings then an appropriate budget for fisheries management services in Nicaragua could be in the order of US$2 million per annum. Use and access rights fees are to be paid in all fishing activities for commercial purposes.

9.3 Issues associated with ability to pay

Keizire (2001) points out that from information provided by empirical studies the potential economic rents in fisheries typically range from 10–60 percent of the gross value of landings. In Nicaragua, the gross value of landings may be estimated in the neighbourhood of at least US$100 million. Hence, the potential rents should be at least US$10 million and quite possibly as high as or higher than US$50 million annually.

In comparison, the annual expected costs of fisheries management have been estimated at approximately US$2 million. Thus, it seems clear that it is technically possible to recover from the industry the full costs of fisheries management services. It is another question whether it is economically feasible to aim for full rather than a partial cost recovery.

It is important to note that although full cost recovery may be technically achievable, it may not be politically feasible. The Nicaraguan fishing industry has resisted the imposition of charges, especially under the argument that “the financial situation of the fleets and companies are not in good shape”, and the Government has been trying to promote the increase of exports in general through a general policy of incentives (usually through a generous system of vast tax exemption rules). For this case of natural resources exploitation, the result has not been positive in terms of sustainable use and proper management.

Some of the analyses presented in this document clearly show that an appropriate level of cost recovery in Nicaraguan fisheries will be difficult to attain under the current level of fiscal incentives, poorly chosen ways of allocation of the fishery fees, and poor monetary value given to the fishery resources.

10. FISHERIES MANAGEMENT SERVICE PROVIDERS

10.1 Types and levels of services provided by nongovernment sources

At present all fishery services in Nicaragua are provided by the National Government. In aquaculture some scientific research is provided by local universities on new species for fish culture and new culture methods. They also support small cooperatives with training on production systems and organization.

The recent process of decentralization of management functions from the National Government, i.e. MIFIC, to local Governments (Alcaldías or Municipalities) in districts where there are fisheries is a unique process in Central America of local empowerment. However, it does require recognition of the difficulties to manage a complex fishery system with a top-down approach.

In a sense, the central objective of decentralization is promoting comanagement with the Alcaldías administering the management of artisanal fisheries, particularly in registering all artisanal fishers, in issuing fishing permits and identification cards, developing the collection of catch statistics and the creation of statistical databases. The Alcaldías also benefit from collecting taxes. At present, 13 Alcaldías out of 40 have already signed the decentralization agreement with the DGRN of the MIFIC. The plans are to have 100 percent of the local governments decentralized by year 2010.

10.2 Services delivered by fishery participants

At present no services are delivered by fishery participants in a formal and regular manner. Since 2002, some control and surveillance has been carried out during closed seasons, particularly for spiny lobster, but has involved fully provisioned industrial boats provided by some fishing companies looking for lobster traps not hauled out from the water prior the beginning of the closed season.

In compensation for provisioning the boats, the companies keep the ropes recovered. Some vessels also carry fishery inspectors to check the operations and biologists to sample the lobsters retained in the traps. All lobsters found alive are returned to the sea. All of these operations are carried out in close cooperation with the Navy.

10.3 Actions to meet fisheries management objectives and/or options to do so

Actions that have improved the overall capability to meet fisheries management objectives have been the development of an updated fishery legal framework, particularly the development of the guidelines of the national fishery policy in 2001 and the approval of the Fishery Law in 2004 and its bylaws in 2005. This fishery legal framework has clearly established management objectives and the instruments and ways to achieve them. Other actions have been the development of sustainability criteria for shrimp and lobster fisheries and advanced stock assessment methods whose results (biomass and fishing mortality levels) are the basis for computing TACs. Also a complex computer based statistical database of landings, fishing effort, processing and exports have been developed.

Several actions have been taken to improve management services. Among these are the development of the National Register of Fisheries and Aquaculture, a computer based database for computing the revenues from user and access rights fees, and a general diagnosis of the aquaculture sector to improve its planning. One very important step towards the development of a co-management approach has been the decentralization process of management services in artisanal fisheries to local governments, a course of action started in 2004.

Improvements need to be made in terms of monitoring, control and surveillance. Currently, there is a lack of both the personnel and the means to carry out the service in a more efficient way.

Although the Fishery Law mandates the creation and administration of a fisheries development fund for all fisheries management services, the way the revenues from fishery fees are allocated is not particularly useful. The funds available are to be distributed among several actors in such a way that allows little money to be left to the Fund. Moreover, fishery fees are low and not in proportion to the value of the fisheries resources, and the process is distorted by several incentives or subsidies in the form of tax exemptions given to fishers and exporters.

The tax exemption system and the allocation of funds from fishery fees have to be revised and set according to the actual value of the fish resources. However, doing so implies not only amendments in the Fishery Law and also to other related laws, e.g. the Fiscal Fairness Law, which can only be made by the National Assembly (Legislative Branch), but also assessments of the actual value of the fish resources. These aspects will not likely be resolved in the short or medium term, given the political framework currently in place in Nicaragua and the usual strong opposition of many participants in the fishery who collect the incentives provided.

A strong educational campaign and lobby with fisheries stakeholders and decision makers in the Executive and Legislative branches of the Government could promote the idea that properly funded fishery management services are to the benefit of the fishing industry as a whole. As a result, no segment of the industry will benefit from strangling these services through a lack of funds.

Rapid action is required to effectively regulate the fishery sector development by strengthening the implementation of an effective institutional framework with proper financing. Deregulation, decentralization, privatization and the opening up of the economy since the early 1990s is bringing about situations that are very difficult to turn back, once initiated.

A strong institutional fishery management structure can have an important influence on the strength of the link between management and industry. In principle, an institutional framework incorporating a co-management ethos is likely to generate greater industry involvement in (and acceptance of) management decisions.

To better the fishery management process it is also recommended that the Government should clearly distinguish between the expenditures on the administrative aspects of fishery management – such as licenses and permits issuing, fishery data collection from the industry, basic data analysis, etc. – from those required to maintain a productive sector in a long term sustainable way.

Budget preparation and expenditures tracking should also be carried out in close cooperation with the MIFIC central administrative division. This would encourage the realistic definition of the expenditure policy in terms of fishery management objectives, and it would help to ensure that funds are allocated in accordance with policy priorities in an effective manner that allows for increased efficiency in the use of funds. It would also help increase transparency in the budget preparation and tracking process.

11. CONCLUSIONS

Several factors have negatively influenced the sound development of the fisheries sector from a fisheries management point of view.

The organizational component has undergone different changes through the fisheries development. In the 1980s the fishery sector was state-owned: from industrial fishing fleets and the vessels to the processing plants and exporting companies. On that time the fishery sector was ruled by the Nicaraguan Fisheries Institute (INPESCA) with more than 1000 employees receiving a strong support from the national government.

Paradoxically, industrial fisheries operated at very low levels of fishing effort due to the lack of supplies, spare parts, skilled captains, the civil war, and the commercial blockade from the US Government.

Fisheries research had the support from INPESCA and the cooperation from a number of former socialist countries. Monitoring, control and surveillance was carried out by INPESCA in close cooperation with the Navy which on that time had coastguards and ample surveillance coverage at sea.

Although no financial data is available from that period, the INPESCA budget seemed to be high if we consider the number of employees, fishing companies and the companies in charge of domestic and foreign trade. INPESCA was the manager, harvester and trader and was reorganized as a Fisheries Corporation around 1988.

The situation changed at the beginning of the 1990s, after the end of the civil war and with the election of a new government, when a large privatization process was initiated. All fishing companies were given back to the former owners or leased/sold to new investors and all industrial fishing vessels were sold to the captains and sailors or others interested. The trading companies were also sold and privatized. The INPESCA was downsized dramatically.

As the fishery sector was economically depressed after the war, the main objectives of the new government were to recover the operational and exporting levels of the 70s and to rebuild the fishery sector. This meant a change in the role of the State: the new role was to be a facilitator of the business development in the sector in order to increase exports and the earning of foreign exchange. However, the process was not accompanied by an appropriate fishery management strategy. As a result, the fisheries sector developed without proper planning and guidelines for fisheries management and without the supervision of the State.

The process described above has resulted in overcapitalization and overexploitation of the main fish resources. There is no capacity to effectively implement the fisheries management services due to the deficient budget allocated for these purposes, and the chance of obtaining additional funds from penalties on infractions is severely hampered if illegal actions are not prosecuted in an effective way. Fines defined in the new Fishery Law are considerable and – if properly used and managed – could contribute significant funds to the Fishery Management Authorities for the implementation of the fishery management services.

The Nicaraguan fisheries have developed in a direction where the valuable lobster and shrimp stocks have become fully or overexploited both in economic and biological terms. Fishery management faces problems that relate to several well-identified factors, such as organizational structure, conflicting interests, short term interests, overinvestment in fishing effort, and a lack of compliance with regulations. However, there are various positive aspects that could have a constructive impact:

- There is a substantial potential of unexploited resources;
- The shrimp and fish culture have plenty potential for expansion;
- A legal and institutional framework has been worked out that would improve the administration and create the legal mechanisms for effective fishery management;
- There is a substantial improvement in the organizational aspects of the fishery sector; and

- The fishery sector offers very interesting investment opportunities.

As in most other fishing nations, Nicaragua faces significant problems with hard fishing pressure on the important fish stocks. The principal management measures used to control the crustacean fisheries are licence limitations and quotas, closed season regulations, and minimum size regulations. In spite of the different management measures, the fishing effort has increased to a level that is both too high and costly. Nicaragua lacks patrol vessels and their operational funding for controlling its fisheries, both in the inshore and offshore areas. The current fisheries surveillance system is based on a few fisheries inspectors that carry out port, beach and processing plant controls. A satellite based VMS system is considered for the industrial fleet. Four patrol vessels have been pledged by Spain for the future, the funding to operate these expensive vessels is not available, and their existence will impact the budget allocated to fishery management.

The Nicaraguan fishery sector provides a substantial contribution to the overall economy of the country in terms of employment and net income of foreign currency. The overall fishery industry offers solid possibilities to further expansion of its contributions in terms of foreign exchange earnings and food supply for the country's population. Still the fishery sector has plenty of potential to create more productive employment within the harvesting, transformation and fish and shrimp culture branches, provided resources are managed in order to guarantee rational and sustained exploitation on both the artisanal and industrial level.

Under the current circumstances, characterized by an open access policy for the artisanal fisheries and almost lacking MSC to guide the current fishing operations, it is very unlikely that sustainable exploitation can be guaranteed. A strong institutional incidence and funding will be required to successfully provide fisheries management services.

The above mentioned is related with the fact that the State has not accredited the true value of a Nation's property that should carefully and dutifully be administered by the Government. In addition, the development of the fishery sector has lacked an appropriate planning process and the full involvement of the Government in the management of the fish resources. The result has been that all the main fisheries are presently either fully exploited or overexploited by uncontrolled fleets exhibiting high fishing capacities, there is a lack of compliance with fisheries regulations by most users, and the fisheries are generating only low levels of revenues for the Government.

Currently, fishery management in Nicaragua is less than optimal due to under funding of the fishery management authority. This under funding is in sharp contrast with the fact that the fishery sector is currently the third largest foreign exchange earner after coffee and tourism. The fishery sector shows the more dynamic growth since 1990 when fish exports were US$9.3 million compared to US$124 in 2000 and US$96.7 million in 2004.

Fishery management funding has come from the central government treasury, from direct contributions of international donors that funded specific projects, and from fines for illegal fishing activities. In order to improve the financing of fishery management the Nicaraguan government developed the concept of a Fisheries Development Fund, which was introduced in the 2004 Fishery Law. However, one important drawback of this Fund is that not all the revenues drawn from fisheries will enter directly into the Fund; instead some are allocated to local and regional governments and to the National Treasury. This is particularly important concerning the fees generated from access and use rights in the fisheries carried out within the Autonomous Regions in the Caribbean.

Since 1990 the Government of Nicaragua started a downsizing programme of the governmental fishery sector where the role and participation of the State has been greatly reduced. The Government reduced the budget for providing fisheries management services from US$2 million per annum to almost half a million dollars. With this significant reduction the capacities to deliver efficient fishery management services were severely diminished, particularly in terms of monitoring, control and surveillance. (For example, there were 25 fisheries inspectors in 1996, but not there are less than 15.) The new role of the government as the facilitator for investment is likely not the best solution for the fishery sector, which is a natural resource which requires a major presence in the areas of research, monitoring, surveillance and controls. In the hands of the private industry, the race for fishing is leading to the collapse of various fisheries.

The process described has resulted in large losses of money for the State to capitalize the fishery management services. At the same time, the fishery sector is losing money for improper MCS of illegal size products, trans-shipment and illegal fishing in Nicaraguan waters. A recent study (Ehrhardt, 2005) shows that unreported landings of undersized Caribbean spiny lobster could represent accumulated losses of about US$60 million in the last five years. The Government has allowed the fishing industry to self-manage, but the MIFIC has not had the proper level of authority to impose penalties without the opposition from the industry. In turn, the industry has not acknowledged the long term consequences for not adopting proper fishery management actions.

Nicaraguan fishery management expenditures appear to be small in comparison to the other countries for which estimates have been made. The discrepancy between the costs of fisheries management and the actual benefits generated by this management is fundamentally the result of the absence of a direct link between those who benefit from the expenditures and those who pay for them. The industry is happy to enjoy any perceived benefits of fisheries management without worrying about excessive management expenditures as long as they do not actually pay for them. There exists a generous system of incentives (subsidies) to the fishery sector which impedes the establishment of a proper cost recovery system.

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FUNDING FISHERIES MANAGEMENT: THE CASE OF NEW ZEALAND, 1985–2004

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[1] Oceanic and Atmospheric Sciences and Oregon Sea Grant, Oregon State University, United States of America.

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ABBREVIATIONS

ACE	annual catch entitlement
CRAMAC	Crayfish Management Company
CSEC	Challenger Scallop Enhancement Company
DoC	Department of Conservation
EEZ	exclusive economic zone
ITQ	individual transferable quota
MFish	Ministry of Fisheries
NRLMG	National Rock Lobster Management Group
QMA	Quota Management Area
QMS	Quota Management System
RCC	Research Coordinating Committee
RLIC	Rock Lobster Industry Council
SeaFIC	New Zealand Seafood Industry Council
SOI	Statement of Intent
TAC	total allowable catch
TACC	total allowable commercial catch

EXECUTIVE SUMMARY

Introduction

The funding of fisheries management in New Zealand over the last two decades is a story of fundamental principle, public policy experimentation, legal challenge and collective resolution of difficulties through research, review and constructive dialogue between stakeholders and the government. Importantly, funding issues cannot be separated from the evolution of fisheries management itself. Reviewing this history and tracing the maturing of fisheries management and its funding in New Zealand reveals many legal and institutional design lessons for fisheries managers in developed and developing countries.

Institutional Context

The Fisheries Act 1996 forms the statutory basis for all fisheries management by the Crown (Government) in New Zealand. Separate management systems exist for recreational, customary Mäori, (New Zealand's indigenous peoples) and commercial fisheries. The purpose of the Fisheries Act 1996 is to enable the utilization of fisheries resources while ensuring sustainability.

The Ministry of Fisheries performs the majority of the Crown's fisheries management responsibilities. The primary purpose of the Ministry of Fisheries is to ensure that marine fisheries are sustainably used within a healthy aquatic ecosystem.

The Fisheries Act 1996 allows many duties and powers that are the responsibility of the Chief Executive of the Ministry of Fisheries to be delivered by the Ministry or by a service delivery agency under a contract. The Act also provides for devolved services where an external organization has responsibility for both purchasing and ensuring the provision of relevant services.

Funding of Fisheries Management 1985 to 2004

The current system for funding fisheries management has developed over many years in response to external public sector reforms and changes to internal operating practices within the Ministry of Fisheries. The Ministry receives its funding as an appropriation from Parliament. The Fisheries Act 1996 enables the Crown to recover some of these costs from the commercial fishing industry through the cost recovery regime managed by the Ministry.

History

1985 to 1994

Prior to cost recovery there was limited recovery of the public costs of fisheries management. Government recovered some costs through transaction fees. The Government also required the commercial fishing industry to pay resource rentals for both quota and non-quota species. Approximately $22 million per annum of resource rentals were being paid by the commercial industry in 1994.

1994 to 2001

A cost recovery regime was introduced for the first time from 1 October 1994. The obligation to pay rentals was also repealed. In the first year of cost recovery the industry paid levies of around $34.6 million. There was an expectation, however, that the amount of levies payable would reduce over time as cost recovery brought about efficiency gains within the Ministry and as the industry moved to undertake a more direct role in fisheries management and the purchase of research.

The key features of the cost recovery regime operating from 1994 to early 2001 were:

- The purpose of the cost recovery regime was to "enable the Crown to recover its costs" in respect of fisheries services and conservation services.
- The Ministry applied a policy known as the "avoidable cost" principle as a matter of administrative practice. This attempted to recover all costs incurred by the Government due to the existence of the commercial fishing industry.

Levy rates were set annually and recovered management costs incurred during a fishing year in monthly payments over the course of that fishing year. Prior to fixing any annual levy, the Minister was required to consult with the commercial fishing sector on the costs to be recovered by way of levies.

As a result of external reviews held during 1996 and 1998 changes were made to the cost recovery regime in 1999. The new regime came into full effect in early 2001 and remains the regime in operation today.

Current funding regime

The central feature of the revised cost recovery regime is a statutory statement of principle on which cost recovery is based. Five principles in the Fisheries Act provide that:

- Persons who request a service must pay for that service.
- Costs of services "provided in the general public interest, rather than in the interest of an identifiable person or class of person" cannot be recovered and are borne by the Crown.
- Costs must, so far as practicable, be "attributed" to the persons who benefit from the expenditure.
- Persons who cause risk to or an adverse effect on the aquatic environment must, as far as practicable, pay the costs of services required to manage those risks or adverse effects.

Private costs of fisheries management

Little formal study of the private cost of complying with fisheries management legislation and participating in public fisheries management processes has been carried out in New Zealand. Costs imposed on the sector by government regulation have a major impact on the viability of the industry:

- International competitors are often subsidized. New Zealand does not subsidize its seafood industry.
- The seafood industry's share of the world markets is small and there are many competing seafood products so the industry is unable to pass along increases in costs.
- Mäori have significant interests in commercial fishing and increasing cost recovery levies would reduce the value of the Treaty settlement over the allocation of commercial fishing rights potentially leading to further Treaty grievances against the Crown that hinder the development of the industry.

Statutory funding of private fisheries management costs

New Zealand's government recognizes that private costs can be incurred in "industry good" activities such as industry representation by professional staff during consultative processes. The Commodity Levy Act 1990 enables many commodity producing industries, including the seafood sector, to finance industry-good activities where voluntary funding would lead to a 'free-rider' problem or would be impracticable. To raise a levy under the Act an industry group must first hold a referendum and gain 50 percent support of those responding and 50 percent by volume of production. The levy is compulsory and all producers of the commodity must pay. The Commodity Levy Order lasts for 5 years. To renew or amend the Order a new referendum is required.

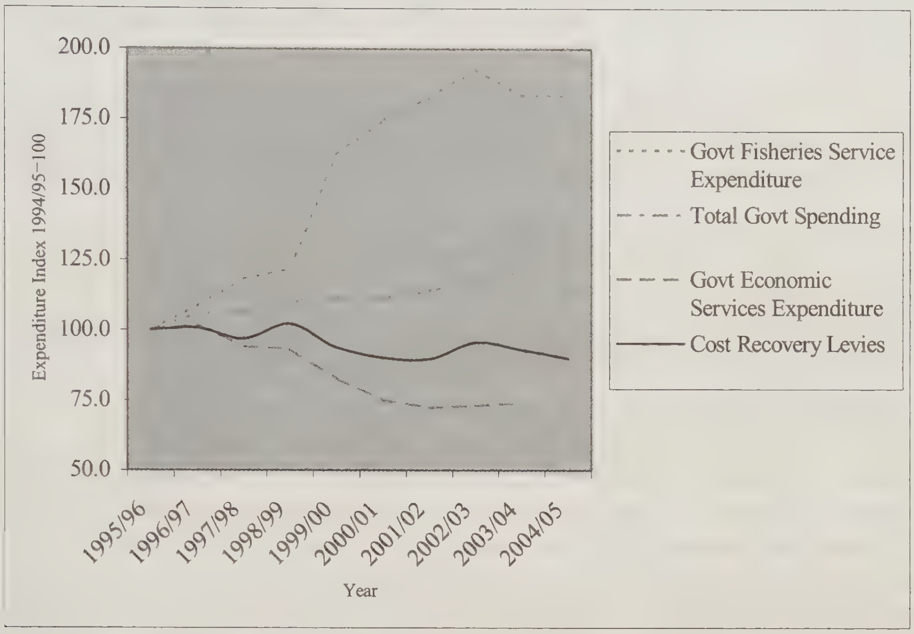
The Seafood Industry Commodity Levy came into force on 1 April 2002 and lasted until 31 March 2007. The levy is used to fund core activities of the New Zealand Seafood Industry Council, including:

- Policy issues affecting the New Zealand seafood industry.
- Promotion of the New Zealand seafood industry.
- Research, science and technical services relating to the New Zealand seafood industry.

Patterns and trends in public fisheries management funding 1985 to 2004

Total fisheries management costs in New Zealand have increased in real terms far faster than commercial fisheries cost recovery levies, general government expenditure or in like sector-based government agencies.

The drivers of this increase appear to be non-commercial such as recreational and customary fisheries management, non-commercial fisheries and marine environment related research and the detection of criminal black market and poaching activities. These management costs are not cost recovered because they are not directly attributable to the commercial fishing sector. Cost recovery from the recreational and customary sectors is politically unacceptable in New Zealand.



In contrast, the cost of managing commercial fisheries has stayed constant in real terms and fallen dramatically as a proportion of total fisheries management expenditure over the period of the study. This suggests the cost-recovery regime for commercial fisheries has been successful in driving efficiency gains in the public costs of commercial fisheries management. Relative stability in real terms of the cost recovery levies since the introduction of the present regime in 2001 also suggests that it has been successful in give certainty to commercial fishers about the level of cost recovery.

Although not conclusive, the quantitative evidence available indicate that the commercial cost recovery system has been fiscally successful as well as giving rise to greater accountability and transparency in fisheries management funding.

Lessons learnt

The system of funding commercial fisheries management in New Zealand is successful in:

- Recovering the costs of fisheries management from the commercial industry.
- Creating transparency and accountability in the delivery of commercial fisheries management services.
- Involving industry in both the determination of commercial fisheries management services and, in some instances, the delivery of fisheries management services.
- Generating efficiencies in the delivery of commercial fisheries services.

Fisheries management regimes with the following characteristics are the most likely to be successful in implementing a New Zealand style of cost-recovery:

- A general public sector ethos of transparency, efficiency and accountability.
- A clearly identifiable and commercial fishing sector.
- A system of fishing rights that have a high degree of durability and hence form the basis for attributing costs and collecting levies.
- Effective commercial stakeholder organizations that represent the commercial industry and can engage government agencies in constructive dialogue and negotiation over cost recovery.
- Government agencies that have strong policy and administrative capabilities.

Clear principles and cost recovery rules are required from the start of any cost recovery regime. The initial absence of any legislated cost recovery principles came close to destroying the integrity of New Zealand's cost recovery regime. Although some tension remains about cost recovery rules as currently legislated, their existence at least provides a foundation for ongoing constructive dialogue between the MFish and the commercial industry.

Accountabilities must be clearly defined and accepted by all parties. Management agencies must provide financial information to industry at a sufficiently detailed level so that it is transparent as to what services the industry is contributing to and whether these costs are consistent with specified cost recovery rules.

Designing and administering a cost recovery system based on cost attribution is complex and resource intensive. Engaging stakeholders in the process has high transaction costs for both participants and the management agency. Nevertheless, not to engage stakeholders reduces the likelihood of acceptance of the attribution system and will do little to bring about efficiencies in the delivery of fisheries services since it tends to be the levy payers who have the greatest incentives to see efficiencies occur.

Any jurisdiction considering implementing a comprehensive cost recovery regime should anticipate initial high transaction costs and perhaps a short-term reduction in efficiency. There is a need to implement new procedures and processes to ensure transparency and accountability. These will inevitably need revision and review in light of actual performance. Stakeholders will naturally demand a greater say in the delivery of services once they become responsible for their funding. At times it will be difficult to separate out behaviours intended solely to reduce industry costs in the short-term from those genuinely intended to improve the performance of the systems. Management agencies must be committed not just to the recovery of costs of fisheries management but to maximising the value derived from the management of a nation's fisheries resources through a suite of policy instruments, of which cost recovery is one.

INTRODUCTION

The funding of fisheries management in New Zealand over the last two decades is a complex story. It is a unique tale of fundamental principle, public policy experimentation, legal challenge and collective resolution of difficulties through tens of thousands of hours of research, review and constructive dialogue between stakeholders and the government. Importantly, funding issues cannot be separated from the evolution of fisheries management itself. Reviewing this history and tracing the maturing of fisheries management in New Zealand reveals many legal and institutional design lessons for fisheries managers in developed and developing countries.

By international standards New Zealand has a low cost system of fisheries management. The cost of fisheries management relative to the landed value of New Zealand's catch is four percent compared to an OECD average of 17 percent (Ministry of Fisheries, 2004a; OECD, 2003). Such international comparisons refer to the costs of fisheries services provided by public agencies and for mostly data collection reasons ignore private costs incurred by fishers and other stakeholders.

This convention is generally followed in this paper. Only costs directly attributable to public sector management are measured for the whole period 1985 to 2004. The OECD (2003, p. 12) considers that public management costs relate to:

- Research to inform fisheries management decision-makers (research services).
- Creating and implementing fisheries management systems (management services).
- Enforcing fisheries management rules (enforcement services).

Nevertheless, where appropriate, private sector costs are described where they can be identified as directly contributing to these fisheries management activities.

This paper is organized as follows. Part One provides an overview of New Zealand's fisheries, their management and key institutions.

Part Two traces the evolution of fisheries management funding in New Zealand from 1985 to 2001. It looks at both changes in funding policy and changes in funding itself. Two periods are examined: 1985 to 1994 when resource rentals were charged, and 1994 to 2001 where resource rents where replaced by a system of cost recovery of management costs from the commercial fishing industry.

Part Three looks at funding regime for fisheries management in New Zealand that has been in place since 2001. It addresses the funding of central Government fisheries management activities and describes the devolution and delegation of some commercial management activities to New Zealand's commercial fishing sector.

Part Four examines patterns and trends in fisheries management expenditure from 1985 to 2004 with particular emphasis on era of cost recovery 1994 to 2004. Part Five explores case studies that highlight issues of funding policy, cost-effectiveness and accountability. These case studies are:

- Fisheries research services and cost recovery.
- Delegation and devolution of fisheries management responsibilities and efficiency gains.
- Complexities of moving from cost recovery principles to implementation.
- Cost recovery and financial accountability: The saga of "unders" and "overs".

Part Six discusses key issues, possible future directions and broad lessons for funding the management of commercial fisheries.

1. OVERVIEW OF NEW ZEALAND'S FISHERIES, MANAGEMENT AND KEY INSTITUTIONS

1.1 Overview

The New Zealand exclusive economic zone (EEZ) is the fourth largest in the world at approximately 1.3 million square nautical miles. A characteristic of the EEZ is its depth, with 72 percent in waters more than 1 000 metres deep, 22 percent between 200-1000 metres, and only 6 percent less than 200 metres. Fishing within the EEZ is heavily reliant on species found in waters at depths ranging from 200-1200 metres, rather than species found in shallower waters.

Despite the size of the New Zealand EEZ, its fisheries resources are not as abundant or productive as in many other parts of the world. Contributing factors include a narrow continental shelf, a lack of nutrient upwellings, and being on the periphery of the range of highly migratory species such as tuna. Nevertheless marine ecosystems and species are considered diverse (Ministry of Fisheries, 2004). About 8 000 marine species have been found in New Zealand waters, including 964 species of fish, 2 000 species of molluscs (snails, shellfish, and squid), 400 species of echinoderms (sea urchins, starfish), and 900 species of seaweed.

The commercial fisheries sector is New Zealand's fifth largest export earner. In 2003, the export value from the fishing industry was NZ$1.2 billion. Exports account for by far the largest proportion of the product with about 88 percent by value being exported. The industry is also a large employer, involving some 26 000 people through direct employment and flow on effects. Unlike most other countries, the New Zealand industry receives no government subsidies.

The Fisheries Act 1996 forms the statutory basis for all fisheries management by the Crown. Separate management systems exist for recreational, customary Mäori, (New Zealand's indigenous peoples) and commercial fisheries. The purpose of the Fisheries Act 1996 is to enable the utilization of fisheries resources while ensuring sustainability, and it includes provisions for:

- Environmental protection.
- Customary fishing regulations.
- Recreational fishing regulations.
- Bringing new species into the quota management system.
- Resolving disputes between fishers over access.
- Consultation on fisheries management.

Recreational marine fisheries are managed as open access fisheries and, as such, are either non-exclusive or excludable at only very high cost, and the rights to the fisheries are held in common. Recreational regulations determine daily bag limits, minimum fish sizes, method and gear restrictions, closed areas and closed seasons.

The management of customary Mäori fisheries is based on a territorial use rights system where harvesting rights are restricted to specific groups or communities. Shares are allocated within the group through a variety of administrative or negotiated processes such as rahui (ban on taking of kai moana (seafood)), mataitai (area of seashore that is managed as a traditional subsistence fishery by iwi or hapu (tribe or sub-tribe)), taiapure (area of coast that is managed by an iwi committee that has customary authority to make rules regarding access and exploitation rates that are legally binding on all fishers). Tangata Kaitiaki (guardians) are nominated by iwi or hapu and appointed by the Minister of Fisheries to approve the collection of kai-moana for customary purposes. In most cases there is no exclusivity to the stock, though spatial exclusivity is guaranteed in the case of mataitai, so they are affected by (and in turn affect) extractions from the same stock by commercial and recreational fishers.

The main method for managing commercial fisheries is the quota management system (QMS). The characteristics, strengths and weaknesses of the New Zealand QMS are well documented in the fisheries management literature (see, for example, Bess and Harte, 2000; Batstone and Sharp, 1999; Clark *et al.*, 1988; Dewees, 1989; Harte, 2001; Hersoug, 2002; Memon and Cullen, 1992; Sissenwine and Mace, 1992). For each QMS species, New Zealand's 200 mile Exclusive Economic Zone is divided up into a number of management areas known as quota management areas (QMAs). The Minister of Fisheries sets an annual total allowable catch (TAC) for each fish stock in each QMA. In general, the TAC is set at a level that ensures the fish populations remain at or above a level that will produce the maximum sustainable yield. An allowance is made within the TAC for customary Mäori fishing, recreational fishing and any other sources of fishing-related mortality. The remaining portion of the TAC is known as the TACC or total allowable commercial catch.

Comprehensive in its application, 93 species or groups of species – representing over 85 percent of the total known fish catch in the EEZ – are currently managed as 550 separate fish stocks under the QMS. The large number of stocks arises for historical, biological and administrative reasons. Generally, New Zealand's EEZ is divided into 10 QMAs. Unless there are biological reasons for aggregating quota management areas (or subdividing them further) each species is managed as 10 separate stocks. The few remaining non-QMS commercial fisheries are managed through restricted entry licensing, catch limits and gear restrictions. Table 1 provides an overview of New Zealand's fisheries.

Table 1: New Zealand fisheries: an overview

EEZ size	3.37 million square km
NZ Coastline	113 000 km
Marine species described	8 000
Species commercially fished	130
Quota Management System stocks	
Number of species/species complexes in the QMS	93
Individual stocks	550
Information available on stock status	60-70% of stocks
Stocks at or near target level	80%
Customary Fisheries	
Taiapure-local fisheries	7
Mätaitai reserves	3
Tangata Tiaki appointed (South Island)	124
Tangata Kaitiaki appointed (North Island)	135
Recreational Fisheries	
Recreational fishers (as a percent of the population)	20%
Commercial Rights Holders	
Tonnes caught	> 580 000
Total quota asset value	NZ$3.5 billion
Total export value 2003/04	NZ$1.2 to NZ$1.5 billion
Marine farming exports	NZ$200 to NZ$300 million
Direct subsidies	Nil
Persons with quota holding	2 200
Commercial vessels	2 100
Processors and Licensed Fish Receivers	200
Direct employment	10 000
Ministry of Fisheries	
Staff	378
Budget 2004/05	NZ$76.5 million

Source: Ministry of Fisheries, 2004, p 3.

1.2 Government agencies with fisheries management responsibilities

Two government agencies give effect to the majority of the Crown's fisheries management responsibilities:

- The Ministry of Fisheries.
- The Department of Conservation.

The costs incurred by these agencies in the management of fisheries are considered government fisheries management costs for public finance purposes.

1.2.1 Ministry of Fisheries

The primary purpose of the Ministry of Fisheries (MFish) is to ensure that marine fisheries are sustainably used within a healthy aquatic ecosystem. The role of MFish in collaboration with other government agencies, is advising on and implementing government policy in the following areas of responsibility: ensuring ecological protection and sustainability; meeting international and Treaty of Waitangi obligations; enabling efficient resource use; and ensuring the integrity of management systems.

For each of these core responsibilities, MFish exercises many functions, for example:

- Ensuring ecological sustainability:
  - Researching and monitoring the health of fisheries and the aquatic environment and the effects of fishing on the aquatic environment.
  - Specifying environmental standards related to the use of fisheries and the impact of fishing on the aquatic environment.
  - Maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations.
  - Setting, implementing and enforcing sustainability measures.
- Meeting Treaty of Waitangi obligations:
  - Involving Mäori in fisheries management decision making.
  - Delivering 20 per cent of new quota to Mäori.
  - Providing for and protecting customary fishing rights.
- Enabling efficient resource use:
  - Defining and allocating rights to use fisheries resources.
  - Providing management frameworks to allow rights holders to exercise those rights.
  - Recognising and protecting New Zealand's fishing and conservation interests during the negotiation of international agreements.
- Ensuring the integrity of management systems:
  - Evaluating and monitoring fisheries plans.
  - Setting standards and specifications for services such as research and registry administration.
  - Managing fisheries and aquatic environment information.
  - Delivering criminal law enforcement and prosecution services.
  - Ensuring management and information frameworks are consistent with New Zealand's international fisheries obligations.

MFish has approximately 380 staff and has offices in 20 locations around New Zealand.

1.2.2 Department of Conservation

The Department of Conservation (DoC) has a statutory function to advocate for conservation of natural and historic resources. It has responsibility for marine reserves and protecting marine mammals and seabirds. MFish works with DoC on operational advice concerning protected species interactions with fishing, and marine reserve proposals under the Marine Reserves Act. The views and input of DoC officials are often sought in the development of MFish policy. DoC regional offices interact with MFish staff at a local level on fisheries related issues.

A Memorandum of Understanding formalizes the way MFish and DoC work together. It is aimed at ensuring co-operation in a number of areas including: protected species fisheries interactions, marine reserves, biosecurity risks, research and the nature and extent of fisheries and conservation services.

1.2.3 Other central government agencies with fisheries related roles

A number of other government agencies have fisheries-related roles. These are carried out during the exercise of wider duties, functions and powers and as such are not generally considered fisheries management costs for public finance accounting purpose. With the exception of the NZ Defence Force, these costs are likely to be small relative to overall agency budgets. However, the inability to accurately account for the cost of these activities will result in an underestimate of the public cost of fisheries management.

These other agencies include the following:

- Ministry for the Environment that works with MFish on environmental indicators for fisheries, marine farming, and oceans policy. The Ministry for the Environment also provides input on a range of fisheries policy issues and a statutory role in relation to devolution of fisheries services to an Approved Service Delivery Organization.
- Ministry of Foreign Affairs and Trade is the lead government agency on most international fisheries issues, MFish provides specialized technical support to the Ministry of Foreign Affairs and Trade.
- Ministry of Agriculture and Forestry has the lead role in implementing the Biosecurity Act 1993 in terrestrial, marine and freshwater environments.
- The New Zealand Food Safety Authority is a separate organization attached to the Ministry of Agriculture and Forestry. It is New Zealand's controlling authority for imports and exports of food and food related products.
- Ministry of Research, Science and Technology and Foundation for Research, Science and Technology assist MFish to determine research and funding priorities in fisheries research and minimize the overlap of research between funding organizations.
- New Zealand Police provide MFish with operational assistance for enforcement activities. Sworn members of Police are deemed to be Fishery Officers under the Fisheries Act 1996.
- New Zealand Defence Forces have responsibilities for surface and aerial surveillance of the EEZ. MFish and the Defence Forces share information on offshore fishing operations to ensure that surveillance efforts are directed at the areas of highest risk and that fisheries related surveillance capacity is efficiently utilized.

1.3 External service providers

The Fisheries Act 1996 allows many duties and powers that are the responsibility of the Chief Executive of the Ministry of Fisheries to be delivered by MFish or by a service delivery agency under a contract. The Chief Executive retains accountability for the provision of a contracted service. Most fisheries research services in New Zealand are contestable services.

The Act also provides for devolved services where an external organization has responsibility for both purchasing and ensuring the provision of relevant services, with the agreement of the Minister of Fisheries. In such cases, the Chief Executive of the Ministry of Fisheries is no longer accountable for provision of the service. Once functions, duties and powers are devolved to an external organization the specific related services become the sole responsibility of the organization to deliver. Failure to comply with the statute and standards and specifications can lead to civil sanctions imposed on the organization.

1.3.1 FishServe

Many registry-based QMS services are devolved or contracted to the New Zealand Seafood Industry Council Ltd (SeaFIC) as an approved service delivery organization. Commercial Fisheries Services, a wholly owned subsidiary of SeaFIC, delivers these services. It operates under the brand name "FishServe".

Functions, duties and powers devolved to FishServe include:

- Registering clients and vessels.
- Licensing fish receivers.
- Issuing catch return books and operating returns management processes including electronic data transfer for statutory reporting.
- Processing quota and annual catch entitlement transactions, including mortgages and caveats.
- Reconciliation of fishers' actual catches against their catch entitlements.

In addition to devolved services, FishServe provides services under contract to MFish. Contracted services include:

- Delivery of catch effort services, including issuing return books and the returns management process.

- Issuing fishing permits.
- Registering foreign owned vessels, charter vessels, and fish carriers.
- Monitoring catch limits.
- Delivery of revenue services, including invoicing, receiving and debt management of cost recovery and deemed values.

1.3.2 National Institute for Water and Atmospheric Research

Research projects are let through a contestable tendering process where tenders are evaluated on a best value basis, combining aspects of both quality and cost. Most contracts for fisheries research, in what is still a relatively "weak" market, have been awarded to the National Institute for Water and Atmospheric Research Limited (NIWA). As well as its research activities, NIWA maintains, under contract to MFish, research databases and other research information.

1.4 Stakeholder Groups

The Fisheries Act 1996 requires the Minister of Fisheries to consult with stakeholders including Mäori, the commercial fisheries sector, recreational fishing interests and environmental groups before making many statutory decisions. The costs incurred by these groups through engaging in the public fisheries management process are part of the private costs of fisheries management in New Zealand.

1.4.1 The New Zealand Seafood Industry Council Limited

SeaFIC is an industry owned limited liability company that represents the interests fishers, harvesters, the marine farming sector, processors, retailers and exporters. It provides professional advice to Government and the industry on fisheries management policies and practices and scientific issues.

A board of directors manages SeaFIC. The shareholders are principally commercial stakeholder organizations. The company is organized into the following business units:

- Science.
- Business Policy.
- Trade and Information
- Industry Training.

The Science group are responsible for fisheries science, research and development, while Business Policy are concerned with fisheries law and regulations, property rights in capture fisheries and marine farming, and environmental issues. Trade and Information incorporates trade and international policy, seafood standards and the provision of information services to industry. The Seafood Industry Training Organisation (SITO) is responsible for facilitating competence-based training across all areas of the seafood industry, including both industry-specific and generic skills. SeaFIC owns Commercial Fisheries Services Ltd as described previously.

SeaFIC's shareholders are Commercial Stakeholder Organisations which represent 94 percent of the productive value of the industry, the New Zealand Federation of Commercial Fishermen, the New Zealand Fishing Industry Association, the New Zealand Fishing Industry Guild and the New Zealand Seafood Retailers and Wholesalers Association.

There are over 30 Commercial Stakeholder Organisations representing specific fisheries or geographic regions. They have several key functions in common (Bess and Harte, 2000):

- To facilitate the collection of funds to finance fisheries management activities, such as research or by-catch mitigation monitoring, and to manage the delivery of such services.
- To represent the interests of commercial fishers in government processes that involve consultation such as the determination of government required fisheries management services and the setting of sustainability regulations.
- To promote the expansion and development of commercial management rights.

The Commercial Stakeholder Organisations are varied in organization and structure to best meet the needs of the commercial fishing interests they represent.

1.4.2 Te Ohu Kaimoana

Te Ohu Kaimoana (Te Ohu) was established by the Mäori Fisheries Act 2004. Te Ohu is the corporate trustee of Te Ohu Kai Moana Trust - the trust responsible for advancing the interests of iwi (tribal groups) in the development of fisheries, fishing and fisheries-related activities. Its main task is the administrating, allocating and transferring treaty settlement fisheires assets to mandated iwi organizations.

Te Ohu plays a vital advocacy role on behalf of Mäori. Te Ohu aims to provide a central voice when any legal reforms are proposed that relate to either the seafood sector, or ownership/management of marine and freshwater environments.

1.4.3 Other stakeholders

There are a number of environmental groups with strong interests in the sustainability of fisheries and the effect of fishing on the environment.

Marine recreational fishers do not belong to recreational fishing organizations. However, several recreational fishing stakeholder organizations represent or advocate for the recreational fishing sector.

Most customary Mäori fishers are not adequately resourced to participate in statutory consultation processes, although programmemes are in place to address this.

1.5 Marine farming

Until the end of 2004 MFish was responsible for allocating rights for marine farming in the form of marine farming permits, and assessing the impact of marine farming on capture fisheries. Regional Councils (a level of local government) manage the effects of aquaculture on the wider marine environment.

A reform of marine farming management that came into effect at the beginning of 2005 gave regional councils greater powers to manage and control the development of marine farming by requiring new developments to take place within marine farming management areas. Regional councils now have sole responsibility for managing the adverse effects of marine farming on the environment, including effects on fisheries resources. To provide ongoing protection of fisheries interests, including the Crown's obligations to Mäori under the Deed of Settlement, MFish will retain the role of determining whether the establishment of a proposed Marine Farming Management Area will have an undue adverse effect on fishing. MFish will also maintain a registry of fish farmers, to impose restrictions in relation to the acquisition and disposal of farmed stock.

For the purposes of this paper, marine farming costs incurred by MFish in managing the impacts on capture fisheries resources and permitting activities are counted as fisheries management costs. The costs incurred by Regional Councils in managing marine farming impacts on the wider environment are not included as fisheries management costs.

2. HISTORY OF FISHERIES MANAGEMENT FUNDING IN NEW ZEALAND 1985–2001

2.1 A brief historical context

The evolution of fisheries management funding in New Zealand cannot be separated from the significant and far reaching changes in public sector management philosophy generally and in fisheries management philosophy specifically, that occurred in the mid 1980s (Stokes *et al.*, 2006; Hersoug, 2002). Boston *et al.* (1999) note that public sector reform was dominated by issues relating to:

- The appropriate design of incentive structures and governance arrangements.
- Avoiding provider capture.
- Contestability and external contracting of services.
- The minimisation of transaction costs and agency costs.
- The tighter specification of public services as outputs and outcomes.

The resulting public sector reforms are characterized as (Stokes *et al*,. 2006; Hersoug, 2002):

- The decentralisation of management responsibilities.
- A shift from input to outcome based management reflected in an output related appropriation system.
- Commercialisation of many public services (e.g. science).
- A shift in emphasis from public service to customer service.
- Separation of policy and operational responsibilities and an output related appropriation system.

As the following sections will show, these forces shaped the evolution of fisheries management funding. Several specific fisheries related developments are also seminal forces (MFish, 2004a). These are:

- The establishment of New Zealand's EEZ in 1982, from which time New Zealand assumed management control of all fishing in the 200 nautical mile zone.
- Reflecting market-based public sector reforms, the introduction of the Quota Management System in 1986 and its application to most major commercial fisheries.
- The Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 providing for the settlement of Mäori fishing claims. The settlement gave Mäori a stake in New Zealand's fishing industry and provided for ongoing non-commercial customary fishing rights.
- The implementation of cost recovery in 1994 requiring the commercial sector to pay the costs of the services that support their fishing activities.
- The establishment of the Ministry of Fisheries as a stand alone Government agency in 1995 and the concomitant commercialisation of fisheries research services by transferring them to the National Institute of Water and Atmospheric Research, an independent Crown Research Institute.
- The Fisheries Amendment Act 1999 establishing the framework within which approved service providers could supply specified fisheries services.

2.2 Fisheries funding policy 1985 to 1994

Prior to the introduction of the QMS in 1986, nearly all the costs of fisheries management funding were borne by the Crown and funded through budget appropriations. These appropriations were ultimately funded through New Zealand's general taxation system. The exceptions were some transaction fees charged for commercial fishing licences and related administrative services.

In 1986 the QMS was introduced for 29 species and fishers were allocated individual transferable quotas based on catch history and a secondary assessment of their commitment and dependence to the fishery. Quota owners were required to pay resource rents on the quota they held.

Resource rental rates were set out in a schedule to the Fisheries Act 1983. Under section 107G of the Act , the Minister was required to set rentals having regard to:

- The value of individual transferable quotas for the species or class of fish.
- The net returns and likely net returns to commercial fishermen for fish caught; including any difference in operating costs of foreign owned New Zealand fishing vessels and other New Zealand fishing vessels.
- Any relevant changes in total allowable catches.
- Any submission made to the Minister under subsection (6) of this section.
- Such other matters as the Minister considers relevant.

The rates could be varied by the Governor General by Order-in-Council on the recommendation of the Minister of Fisheries. Rental increases were not to exceed 20 percent in any one year and the Minister was required to consult with the industry before making any recommendation.

The rationale for charging resource rents was complicated. McClurg (2000) suggests the government had three distinct yet simultaneous objectives with its rental policy:

- Provide revenue to offset fisheries management costs. Government intended that the QMS would be self funding but did not directly link the costs of managing commercial fisheries to the resource rents charged.
- Minimize the fiscal impact of the Crown's QMS management risk. When the QMS was created ITQ was awarded as a fixed tonnage. If the TACC was reduced, the Crown was required to buy back quota. If the TACC was increased, the Crown was entitled to sell ITQ. Resource rents were intended to "tax away" super profits and keep the price of quota low. The Crown's fiscal liability in the event of having to buy back quota was therefore minimized.
- Capture some of the economic rent generated by TACCs/ITQs as a return to the public. Conventional thinking held that excess rents or super profits were generated under the QMS because rent dissipating behaviours such as the race for fish and overcapitalisation were suppressed under ITQ systems.

McClurg (2000) states that the rental regime was designed to encourage low quota prices. Minimizing entry costs to the industry and discouraging speculative ownership of fishing quotas were two secondary objectives of this policy. The then Fisheries Act's mechanisms for setting resource rents were intended to identify these super profits and give effect to the low quota price policy. Not surprisingly given its complexity the resource rental regime began to unravel quickly. There were many reasons for this including:

- Rent seeking behaviour by fishers who during the annual statutory consultation processes presented much evidence that fishing did not generate excess rents beyond normal profits in a risky and capital intensive business.
- An apparent misconception that because fishers did not directly pay for the initial allocation of quota based on catch, supernormal profits and hence rents were generated on the sale of ITQ. However, this ignored the fact that the value of quota could only be realized on its sale and those subsequent purchasers of the rights paid a price based on the discounted value of expected future rents generated in the fishery. In other words rents were captured in the price paid for quota and on the basis of the capitalized value of quota, profits were unlikely to super-normal.
- The Crown was able to sell unallocated quota and itself benefited from higher rather than lower quota prices. In 1987, the Crown raised NZ$77 million from the sale of quota and NZ$19.5 million from the lease of quota. In the same year reductions in some TACCs required it to pay out NZ$42 million leaving it with a net revenue of NZ$54 million (McClurg, 2000).

By the late 1980s government officials were becoming concerned about the Crown's contingent liability to buy back quota in the event of TACC reductions. TACC reductions had occurred in a number of important fisheries and the Crown had little surplus quota left to sell. In 1990 the Government amended the Fisheries Act 1983 to replace fixed quota with proportional quota thereby transferring the risk of quota cuts from itself to the commercial fishing industry.

ITQs now represented a proportion of the TACC rather than a fixed tonnage. For example in a fishery with a 1 000 tonne TACC, a fixed tonnage of say 200 tonnes was transformed into a 20 percent quota share. If the TACC now decreased to 800 tonnes, the same quota holder's share would be 160 tonnes. Government no longer had to buy quota back at the market price through a complex tendering and compulsory buy-back system.

The commercial industry sued the Crown for NZ$130 million in damages because of the change to proportional quota. A negotiated settlement resulted in an agreement which caused resource rents to be directed into a compensation fund for quota owners affected by quota cuts. Increases in resource rents were also restricted to the rate of inflation.

Alongside this unravelling of the resource rent regime, two reviews of the QMS system were carried out. Both called for the replacement of resource rents with a cost recovery regime. Pearse (1991, p. 15) wrote:

> *... the guiding principle in distributing the burden of government charges should be cost recovery: that is, the required revenue should be raised through charges on holders of fishing rights, distributed among them in a way which corresponds, as closely as possible, to the costs they impose on the Treasury.*

The second review called for increased accountability and use of market mechanisms in fisheries management (Fisheries Task Force, 1992 pp. 24-25):

> *The government can ultimately determine the nature and standard of the compliance, research and monitoring services it will purchase in order to ensure environmental bottom lines are met. It is assumed that the costs of supplying these services will be recovered through user charges. Cost recovery is important to ensure the efficient production of those services.*

Stakeholders in fisheries are often best positioned to decide what form services should take and what relative priority should be given to different activities. They may choose to purchase certain compliance or research services directly, rather than to pay for them through user charges. The specification of services to be purchased by the government and users is therefore a task which should be carried out within a context of close consultation between the parties.

Also, a uniquely New Zealand factor came into play – the final settlement of Mäori claims under the Treaty of Waitangi to commercial fisheries in 1992. In 1989 an interim settlement provided Mäori with 10 percent of all quota for species in the QMS at that time. In late 1992, the final settlement provided Mäori a guarantee that 20 percent of the quota for any new species introduced into the QMS would be allocated to Mäori. During settlement negotiations the concept of Crown ownership of fisheries resources came under intense challenge from Mäori and the maintenance of a valid resource rental regime based on the notion of Crown ownership of fisheries resources became untenable. The settlement was therefore the final nail in the coffin of resource rentals. The settlement continues to play a major role in the evolution of fisheries management as it the QMS that is the "currency" of the settlement between Mäori and the Crown (Stokes *et al*,. 2006).

By 1992 the debate had become one of cost recovery versus resource rents. The then Ministry of Agriculture and Fishery supported the abolition of resource rentals and replacement with cost recovery on three grounds (Ministry of Agriculture and Fisheries, 1995):

- Under the Treaty settlement it had been established that the Crown had no right to charge resource rents for a resource it did not own.
- Cost recovery would foster efficiency in government provision of fisheries services through accountable and transparent matching of costs and services.
- Cost recovery would encourage greater industry responsibility because more responsible behaviour by industry would mean the need for less regulation and hence lower management costs.

The commercial industry also supported cost recovery in spite of the expectation that cost recovery would collect more than resource rentals since (McClurg, 2000):

- Industry would gain greater say in the specification and efficient delivery of fisheries management services under cost recovery.
- Cost recovery was a more certain way of determining levies compared to a resource rentals calculated by some estimate of economic rent.

Other government agencies and environmental groups opposed the abolition of resource rents on a number of grounds:

- ITQ was a form of exclusive property right granted by the Crown and therefore a return to the community was justified over and above the cost of managing the system.
- The removal of resource rents for fisheries may lead other sectors such as minerals and oil to question the validity of resource rents charged against them.
- That cost-recovery would give the commercial industry an undue influence on quality and quantity of fisheries services provided, particularly research services.

When the commercial compensation agreement for quota reductions expired in 1994, the Treasury supported by other government agencies proposed the retention of resource rents plus the addition of cost recovery (McClurg, 2000). This was supported by the Government of the day. Resource rentals were renamed as "access charges" out of sensitivity to the ownership issued raised in the fishery settlement with Mäori. Mäori protested that the 1992 Deed of Settlement had been negotiated on the basis that quota owners would face either resource rentals or cost recovery, but not both. They argued that the proposed dual system of rentals and cost recovery undermined the value and integrity of the settlement. The commercial fishing industry was outraged at the apparent breach of faith given extensive consultation over the introduction of cost recovery. Faced with this opposition, the Government abandoned any notion of charging resource rentals and enacted cost recovery provisions within the Fisheries Act in October 1994. Most other government agencies regarded implementation as hasty because nearly all prior debate had been about principle rather than the implementation and administration of a cost recovery regime. As the next sections shows they were right to be concerned.

2.3 Fisheries funding policy 1994 to 2001

Cost recovery replaced resource rentals in 1994. MFish (1996) considered that:

"its application would introduce transparency and accountability incentives for both the industry and the Government. That is, it would highlight the level of cost created by the industry and also encourage the Ministry to examine its own cost models and structures to ensure that unnecessary costs were not being passed onto industry participants.

The effect for the commercial industry was to move from paying resource rentals of approximately NZ$22 million in 1993 to paying NZ$34.6 million in cost recovery levies in 1994. Since cost recovery levies directly replaced resource rentals there was no need for a transitional regime. The commercial industry and MFish expected that the amount of levies payable would reduce over time as cost recovery brought about the efficiency gains and increased industry responsibility for fisheries management (McClurg, 2000; Stokes *et al.*, 2006).

The features of the cost recovery regime operating from 1994 to 2001 included:

- A purpose to "enable the Crown to recover its costs" in respect of fisheries services and conservation services.
- A requirement for the Crown to bear a share of the costs of required services, with the Crown's percentage contribution in relation to particular categories of expenditure specified initially in the Act and later in an Order in Council.
- The setting of levy rates annually that recovered the industry's share of management cost incurred during a fishing year. Levies were payable monthly over the course of that fishing year. In 1997 the basis of levying was changed so that levies were set to recover costs relating to a Crown financial year (July-June) but were recovered over the course of the fishing year (October-September).

Prior to fixing any annual levy, the Minister was required to consult on the costs to be recovered by way of levies. The Act required consultation as to:

- The "*nature and extent*" of the fisheries or conservation services, and the costs of those services.
- The "*amount or level or standard*" of the fisheries or conservation services.
- The particular "*projects and activities*" entailed in the fisheries or conservation services, and the "*costs and priorities*" of those "*projects and activities*".
- The method by which the above costs must be "*shared or borne*" by persons in the industry and the "*rate or levy*" necessary to recover those costs.
- When determining the amount required to be recovered, the Minister was required to have regard to "*fisheries–related fees, levies, and other charges fixed by or under the 1983 or 1996 Act"* and the amount of fees or levies or other charges *"recovered, or recoverable"* under those Acts.

McClurg (2000) suggests that though the concept of cost recovery was discussed in detail between 1991 and 1994, the statutory provisions that introduced the cost recovery regime were drafted hastily with little consultation. There was considerable industry opposition to the actual mechanisms selected by the government for determining the cost recovery charges to be levied. Other government agencies also expressed concern about the speed of implementation and had called for a delay. The Ministry of Agriculture and Forestry and Cabinet Ministers rejected this call.

The rushed introduction soon saw major conflict arise between MFish and the commercial fishing industry. This centred on two issues:

- The interpretation and subsequent application of what services should be cost recovered.
- The accountability of MFish for its expenditure.

2.3.1 The principle of avoidable cost

The Fisheries Act in 1994 did not contain a statement of the "principles" under which cost recovery was to operate. As a matter of administrative practice the Ministry applied a policy known as the "avoidable cost" principle that looked to recover all costs incurred by the Crown due to the existence of the commercial fishing industry. Consistent with the principle of avoidable cost, MFish and the Government held the view that:

> *all expenditure that arise [sic] purely as a consequence of the existence of commercial fishing should be recovered from the industry. In addition, some non-avoidable costs which are "jointly" shared between the commercial and non-commercial sectors, such as research, should be chargeable to the industry, in recognition of the degradation of non-commercial values as a result of commercial exploitation" (MFish, 1993).*

The commercial industry supported by other groups such as the New Zealand Law Commission, questioned the legality of the avoidable cost principle by suggesting its application was unreasonable (Primary Production Select Committee, 1998):

- Even if there was no quota management system or local industry there would be an international obligation for New Zealand to manage its fisheries resources for commercial use and this cost would fall on the Crown.
- There would always be an imperative to manage fisheries for commercial purposes because of the net national benefit of doing so.

The commercial industry preferred an attributable cost approach to cost recovery. The industry believed the objective of cost-recovery should be to identify who drives the need or demand for particular costs. By placing responsibility for the costs of services on those who cause them, appropriate incentives would ensure fisheries management activities are focussed and delivered in the most efficient manner.

2.3.2 MFish accountability

Although MFish was legally required by the Fisheries Act to consult on individual projects and services and collected levies related to those projects, the Ministry retained a high degree of flexibility to re-prioritize its activities within broad output classes within a year. This meant that certain projects were funded but not completed or less activity was carried out than budgeted for. Accountability and transparency were key attributes of the supposed cost recovery regime.

At that time the Ministry's position (MFish, 1996) could be summarized thus:

- It is not desirable, practical or efficient to require the Ministry to expend considerable resources in the continuous generation and exchange of information as well as in the justification of costs at a detailed level.
- Cost recovery is not user pays and industry is wrong in attempting to relate levies to individual services and the benefits provided.
- The Ministry has no accountability downwards to levy payers for the delivery of projects and to be held accountable for these expenditures would place a higher degree of accountability to stakeholders compared to Ministers and Parliament.

From an industry perspective, this lack of accountability was unsatisfactory, as was a lack of responsiveness from the Ministry to industry submissions produced during the "nature and extent" consultations after which expenditure decisions were made. MFish maintained this position until 2001 when legal action proved the MFish wrong and forced a change in the MFish position.

2.3.3 Amendments to the cost recovery regime in 1996

By 1996, only 2 years after the implementation of cost recovery, the Government was clearly finding that the cost recovery regime was unwieldy, more complex than anticipated, time consuming and costly in terms of

Government resources (MFish, 1996). It was also concerned that key problems with the cost recovery regime could at some future date result in legal action against the Crown.

The passage of a completely new Fisheries Act in 1996 to replace the 1983 Act created an ideal opportunity to address key issues. Industry continued to argue that the cost recovery regime based on the principle of avoidable cost was really just a device to levy a special tax from the fishing industry. This was largely confirmed when the Primary Production Select Committee suggested that the Fisheries Bill it was reviewing should make it clear that cost recovery provisions were intended to recover a designated total amount from the industry (McClurg, 2000). In the Select Committee's view there should be no close relationship between actual services and benefits the services delivered. This position was not contained in the final version of the Bill passed into law in 1996 because of intense industry arguments that this change went against the primary intent of cost recovery since its inception. Financial expediency should not override incentives to encourage efficiency in the delivery of fisheries services and to encourage the commercial industry to behave in a way that required less regulation. The final Select Committee Report simply indicated that further discussion on the principles of cost recovery was necessary (McClurg, 2000).

In the end, the major changes to the cost recovery regime brought about through the 1996 Act were:

- An express provision was included requiring consideration of under and over recovery of levies.
- Separate (but substantially similar) consultation processes to determine MFish fisheries services and DoC conservation services.

The commercial industry's concerns were still not addressed. These can be summarized as:

- Failure to deliver on the benefits of cost recovery: When introducing a cost recovery regime, rather than a selective tax, Parliament was attempting to create efficiency, accountability and transparency within MFish and DoC. The fact that this had not occurred was to the industry's cost.
- Failure to manage expenditure revenue to the approved required services: Once required services were approved annually and the levy struck, the Ministry essentially put the approved services budgets to one side and managed themselves only in terms of their obligations under the Public Finance Act. No management systems were in place to monitor the delivery of fishery services paid for by levies under the Fisheries Act.
- Lack of change following the 1996 Act. Notwithstanding that the 1996 Act created an express obligation on the Minister to have regard to the under and over collection of levies between the years, MFish and DoC made no management or systems changes to enable this to occur. This provision was included in the Act specifically because of industry's growing concerns at the failure to account for levies between the years, particularly for CSL projects. Parliament's clear intent in adding this section to the Act was ignored.

The period 1994 to 1997 was thus characterized by a deteriorating relationship between the Ministry of Fisheries the commercial industry. The level of anger in the commercial industry was such that the integrity of the cost recovery system itself was threatened.

2.3.4 Review of the cost recovery regime in the 1996 Act

In response to the deteriorating relationship between MFish and the commercial industry the Government agreed to an inquiry into cost recovery by the Primary Production Select Committee. The Select Committee convened in May 1997 and reported in April 1998. Its recommendations were wide ranging covering many issues including:

- A review of the avoidable cost principle of the fisheries cost recovery regime.
- Improving the consultation process.
- Increasing the Crown contribution towards fisheries management costs, particularly policy advice and poaching and black-market enforcement.
- Improving accountability mechanisms.

Concurrently, in February 1998, the Minister of Fisheries announced an independent review of the Fisheries Act 1996. The review was to include the area of cost recovery. The recommendations of the Independent Reviewer in relation to cost recovery were (PricewaterhouseCoopers, 1998):

- That an allocation model be developed based on an efficiency approach where those who benefit pay for the service.
- Services are matched to revenue in a manner consistent with the Public Finance Act 1989.
- That the Act be amended to provide the Minister with the ability to apply a contingency sum of no more than 10 percent of the total costs recovered for additional services.

The theme of providing incentives for greater industry responsibility was again becoming a driver behind the evolution of fisheries funding management and cost recovery. Both the Parliamentary inquiry into cost recovery and the Independent Reviewer found that the avoidable cost principle was acting as a barrier to effective stakeholder participation in the management of fisheries. Government policy papers reflected these views emphasising that (MFish, 1999):

> *the cost recovery regime... needs to be considered in the context of evolving arrangements for increased stakeholder involvement in the purchase of fisheries services, the devolution of some non-core government functions and the introduction of multi-year sustainability plans.*

The New Zealand Treasury also undertook a broad review of charging in the public sector, with a view to establishing common principles for charging. A report from the New Zealand Institute of Economic Research (NZIER, 1999) on how to inplement charging guidelines from the Treasury report showed they were not specific enough to incorporate directly into the Fisheries Act. As a consequence, a set of fishery specific "cost recovery principles" was developed and approved by Cabinet in February 1999. Cabinet also approved the establishment of a joint industry MFish working group to find a way to give these principles practical application.

In July 1999 the working group provided a unanimous report to Government. Later that year the Fisheries Act 1996 was amended to incorporate a revised cost recovery regime. Significantly, the regime replaced the "de facto" avoidable cost principle with a statutory principles based on beneficiaries-pays and risk-creator pays approaches. At the same time the statutory obligation to consult stakeholders was removed although consultation continues to occur as a matter of administrative good practice. The new regime came into effect on 1 February 2001. This is the current cost recovery regime described in more detail in Part Three.

3. CURRENT FUNDING OF FISHERIES MANAGEMENT

The current system for funding fisheries management has developed over two decades in response to external public sector reforms and changes to internal operating practices within MFish. Since 1984 the aim of these reforms has been the accountability and efficiency of government services. Stokes *et al.* (2006) describe the components of efficiency and transparency for MFish financial management as:

- A value for money approach to service determination, including clear links to fisheries management objectives.
- Improved efficiency in the purchase of services (e.g. competitive pricing of services, reduced administrative overheads).
- Elimination of wasteful or unnecessary practices and personnel.
- Transparent processes for fisheries service determination.
- Costs of services attributed to & recovered from those who benefit or generate risk.
- High level of reporting of management outcomes, research results, expenditure and revenue.

The remainder of Part Three describes the current funding regime for fisheries management in New Zealand.

3.1 Public funding of fisheries management costs

MFish and DoC receive their funding as an appropriation from Parliament. The Fisheries Act 1996 enables the Crown to recover much of the cost of managing commercial fisheries from the commercial fishing industry through the cost recovery regime. There is no recovery of costs from recreational or customary fishers. It is important to note that the funding of MFish and DoC is not contingent on the payment of cost recovery levies by the commercial industry. The agencies would still receive their full appropriations whether or not levies were paid.

3.1.1 Fisheries and conservation services

Fisheries and conservation services are legally defined in the Fisheries Act 1996. Fisheries services include:

1. The management of fisheries resources, fishing, and fish farming.
2. The enforcement of provisions relating to fisheries resources, fishing, and fish farming.
3. Research relating to fisheries resources, fishing, and fish farming, including stock assessment and the effects of fishing on the aquatic environment.
4. The performance or exercise, by the Minister or the chief executive or any other person, of a function, duty, or power conferred or imposed relating to fisheries resources, fishing, or fish farming.

Conservation services include:

1. Research relating to the effects of fishing on protected species.
2. Research on measures to mitigate the adverse effects of commercial fishing on protected species.
3. The development of population management plans under the Wildlife Act 1953 and the Marine Mammals Protection Act 1978.

3.1.2 Statement of intent

All government agencies are required to demonstrate the need for the appropriations requested each budget year. Each department produces an annual Statement of Intent (SOI), which details the strategic direction, the outcomes to be achieved, programmes to be undertaken over the next two to five years and an annual output plan that includes a budget for fisheries services. The SOI is presented to Parliament at the time of the Government's budget statement.

In developing its SOI MFish consults with Mäori and stakeholders on the fisheries services to be provided for the forthcoming year. The purpose of consultation is to seek the views of stakeholders on fisheries management issues, and to incorporate those views into the subsequent advice given to Ministers. MFish does not equate this consultation with either "negotiation" or "agreement" with stakeholders about the provision of fisheries management services (MFish, 2004a).

Distribution to stakeholders of the draft SOI occurs in December and this marks the start of the consultation process for the following year's fisheries services. A stakeholder meeting is held in February and written submissions from stakeholders are sought. MFish then provides a final advice paper to the Minister of Fisheries on recommending services for the coming year.

Fisheries related conservation services make up a very small proportion of the DoC budget so only the Conservation Services Programme component of their SOI is consulted on with fisheries stakeholders. This is conducted in much the same manner as MFish consultation on its SOI.

3.1.3 Outputs classes and outputs

Following public sector practice, the SOI categorizes fisheries services as outputs and these are grouped into output classes. Table 2 lists these for 2005 and Appendix I explains them in more detail.

For each output class described in the SOI there is:

- A description of the output class.
- A description of output class objectives.
- An actual budget for the year preceding.
- The current year's approved budget.
- The proposed budget for following year.
- An explanation of year on year changes in the budget.

Changes in the output class budgets can be due to:

- Changes in funding needs and/or priorities
- Outputs within an output class being redefined or reassigned to other output classes.

The SOI reconciles accounts in the latter case, but this has only been standard practice in recent years. For example, in 2004 responsibilities for marine biosecurity were transferred from MFish to another government agency. For 2005/06 a new output class called "aquaculture settlement" is proposed to manage the introduction of new aquaculture legislation. Over time changes to output classifications and even output classes can make expenditure reconciliation difficult.

Table 2: MFish output classes and outputs for 2005/06

Output class	**Output**
Fisheries policy advice	New Zealand fisheries policy advice provided
	International fisheries policy advice provided
	Ministerial services provided
Fisheries information and monitoring	Utilization and sustainability of New Zealand's fisheries resources measured
	Biodiversity of New Zealand's marine environment measured
	Observer services provided
Fisheries management	New Zealand fisheries utilization and sustainability reported
	Deed of Settlement implemented
	Cost recovery process managed
	Statutory decision processes administered
	Registry services managed
Fisheries enforcement	Commercial fishing rules enforced
	Customary fishing rules enforced
	Recreational fishing rules enforced
	New Zealand's international fishing rules enforced
	Poaching and black market activities deterred
	Prosecutions managed
Aquaculture settlement	Aquaculture settlement implemented

Source MFish (2004a)

For all outputs described in the SOI there is:

- A budget for the current year and following financial year.
- An output description.
- Description of performance expectations.
- An explanation of the output.
- A description of expected results.

The SOI also summarizes new services and their cost and any major changes in current service delivery.

Figure 1 shows the make up of MFish expenditure for 2004/05. Total expenditure for the year is approximately NZ$76.5 million.

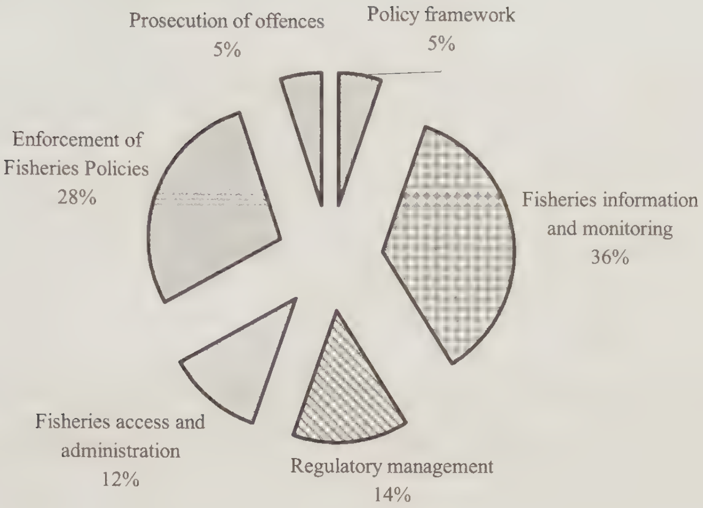


Figure 1: Proportion of MFish fisheries management spending by output class

3.1.4 Cost recovery

Only the cost of commercial fisheries management is recovered in New Zealand. Recreational fishers and customary Mäori fishers do not directly pay towards the cost of managing their fisheries. Recreational license fees are strongly opposed by marine recreational fishers and by elected politicians. The general tax system is held to be the equivalent of cost recovery on the grounds that recreational fishing, unlike commercial fishing, is a public good activity. Customary fisheries management costs are not recovered because this would mean Mäori as owners of the resource are being charged for access to their own resource. This view is based on a consensus interpretation of the Treaty of Waitangi signed in the middle of the 19th century between Mäori and the Crown.

Once the nature and extent of services is described in the SOI is agreed by Parliament, the industry share of those costs is established.

3.1.4.1 Cost recovery principles and rules

Five principles set out in section 262 of the Fisheries Act along with rules set by regulation determine whether, and to what extent MFish costs can be recovered from the commercial industry. Cost recovery levy orders, set by Order in Council, occur annually.

The principles set out beneficiaries-pays and risk-creator pays approaches for the recovery of commercial management costs. The cost recovery principles are:

- If a conservation service or fisheries service is provided at the request of an identifiable person, that person must pay a fee for the service.
- Costs of conservation services or fisheries services provided in the general public interest rather than in the interest of an identifiable person or class of person, may not be recovered.
- Costs of conservation services or fisheries services provided to manage or administer the harvesting or farming of fisheries resources must, so far as practicable, be attributed to the persons who benefit from harvesting or farming the resources.
- Costs of conservation services or fisheries services provided to avoid, remedy, or mitigate a risk to, or an adverse effect on, the aquatic environment or the biological diversity of the aquatic

environment must, so far as practicable, be attributed to the persons who caused the risk or adverse effect.

- The Crown may not recover the costs of services provided by an approved service delivery organization.

The cost recovery rules can be altered as the characteristics of fisheries management services change. Certainty is provided through the cost recovery principles, while the rules and levies change more regularly. Levy orders are currently based on cost recovery rules set in 2001.

Rules must be made by Order in Council, and must be consistent with the principles. The rules prescribe:

- The portion of the costs of conservation services and fisheries services to be recovered from industry as levies (with the balance being paid by the Crown);
- Who must pay the levies; and
- How the costs are to be apportioned between the persons who must pay the levies.

The full text of the rules forms Appendix II. Based on these rules, the proposed funding splits between Government and industry by output class for 2005/06 are given in Table 3.

3.1.4.1 Administration of the cost recovery system

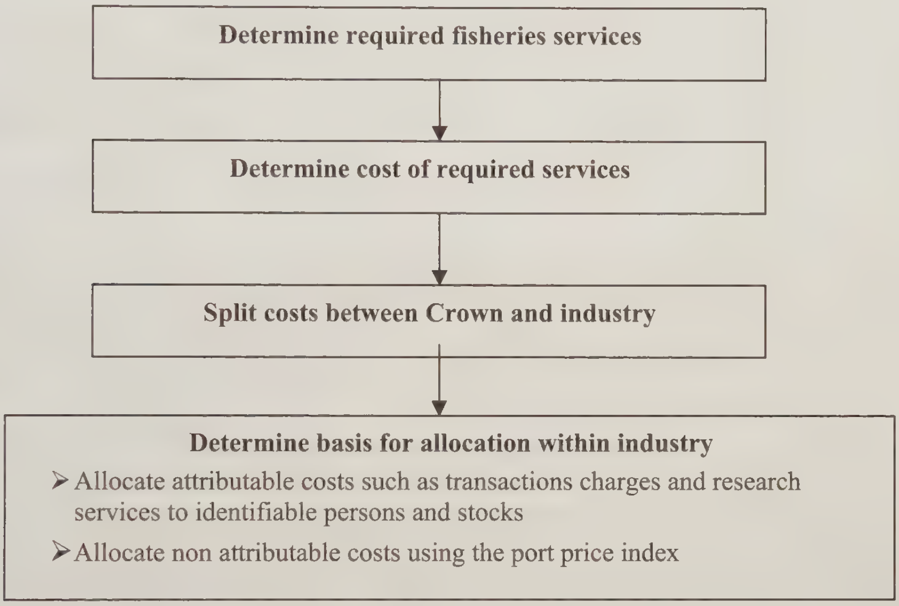
The commercial industry's share of management costs is apportioned between categories of levy payers using a cost allocation model (Figure 1). The model gives rise to a levy rate payable for each fish stock. Ideally costs are recovered at the level of a quota management fish stock and quota holders are levied their respective share. For example a stock assessment for ziffle fish costs NZ$100 000. The total allowable catch, including customary and recreational take is 1 000 tonnes. The total allowable commercial catch is 800 tonnes. There are eight commercial fishers each owning an equal quota share in the stock. The total cost recovery levy for the fishery is NZ$80 000 and the levy payable by each fisher is NZ$10 000.

Table 3: MFish proposed expenditure and cost recovery for 2005/06

Output class/output	Expenditure NZ$'000	Cost recovered NZ$'000	Proportion cost recovered (%)
Fisheries policy advice			
New Zealand fisheries policy advice provided	2 517	0	0
International fisheries policy advice provided	2 200	0	0
Ministerial services provided	927	0	0
Total	5 644	0	0
Fisheries information			
Utilization and sustainability of New Zealand's fisheries resources measured	25 030	16 693	67
Biodiversity of New Zealand's marine environment estimated	4 921	0	0
Observer services provided	3 706	3 706	100
Total	33 657	20 399	61
Fisheries management			
New Zealand fisheries utilization and sustainability reported	8 275	0	0
Deed of Settlement implemented	4 661	0	0
Cost recovery process managed	524	0	0
Statutory decision processes administered	1 524	1 524	100
Registry services managed	5 844	5 844	100
Total	20 828	7 368	35
Fisheries enforcement			
Commercial fishing rules enforced	7 669	7 669	100
Customary fishing rules enforced	2 183	0	0
Recreational fishing rules enforced	5 462	0	0

Output class/output	**Expenditure NZ$'000**	**Cost recovered NZ$'000**	**Proportion cost recovered (%)**
New Zealand's international fishing rules enforced	668	0	0
Poaching and black market activities deterred	11 320	0	0
Prosecutions managed	3 369	0	0
Total	30 671	7 669	25
Aquaculture settlement			
Aquaculture settlement implemented	1 835	0	0
Grand total	**92 635**	**35 436**	**38**

Source: MFish (2004a)


Determine required fisheries services
Determine cost of required services
Split costs between Crown and industry
Determine basis for allocation within industry
➢ Allocate attributable costs such as transactions charges and research services to identifiable persons and stocks
➢ Allocate non attributable costs using the port price index

Source Deloittes (2004)

Figure 2: Cost recovery allocation process

For example, a stock assessment is carried out of an offshore fishery consisting of three stocks, ziffle, piffle and diffle fish species. The cost of the research service is NZ$100 000. Tables 4 and 5 show the basic workings of the attribution model.

Table 4: Calculation of price weighted index

Stock	Allowable catch (kg)	Port price per kg (NZ$)	Weighted index calculation		Price weighted index
Ziffle fish	10 000	4	10 000 x 5 = 50 000	50 000/71 000 =	070
Piffle fish	8 000	2	8 000 x 2 = 16 000	16 000/71 000 =	0.23
Diffle fish	5 000	1	5 000 x 1 = 5 000	5 000/71 000 =	0.07
Total			= 71 000		1

Table 5: Calculation of Compliance Research Levy per fish stock

Stock	Total research cost (NZ$)	Index	Levy per stock (NZ$)
Ziffle fish	100 000	0.70	70 000
Piffle fish	100 000	0.23	23 000
Diffle fish	100 000	0.07	7 000

Using the price-weighted index owners of Ziffle quota shares would pay NZ$70 000, owners of Piffle quota shares NZ$23 000 and owners of Diffle quota shares NZ$7 000. To simplify the math of trading of quota, the Fisheries Act 1996 provides that quota shares in a fishery always total 100 000 000 irrespective of the total allowable catch set. If fisher 1 owns 15 000 000 shares of ziffle fish quota the levy payable by the fisher is 15 000 000/100 000 000 x NZ$66 000 = NZ$9 900.

The multitude of fisheries and conservation services being cost-recovered, different methods for 550 QMS fish stocks and non-QMS stocks make for an extremely complex levy order. To assist levy payers calculate their liabilities, MFish provides a cost recovery levy model in Microsoft Access each year. This can be downloaded from the MFish website (www.fish.govt.nz). Levies are payable monthly. Marine farm levies are annual.

3.1.5 Under and over recovery of levies

An under or over recovery is a variation from the consulted conservation and fisheries services budgets (e.g. MFish SOI and DoC Conservation Services Levy Plan). This can either be an expenditure variance or a revenue variance. An over expenditure occurs when MFish or DoC actual expenditure on a service is higher than budgeted, e.g. a research project costs more than estimated. An under expenditure variance occurs when price for a research project is lower than estimated.

An under recovery of revenue occurs when less revenue is invoiced than projected. An over recovery of variance occurs when more revenue is invoiced than projected. Revenue variances generally occur in fisheries that are outside the QMS because levies are set based on expected catches rather than fixed quota shares in a fishery. For example, MFish may anticipate a catch of 10 000 tonnes of non-QMS species such as albacore tuna. A seabird by-catch programme solely for the albacore tuna fishery costs NZ$100 000. A levy of one cent a kilogram is then estimated for albacore fishers. Because levies are paid on actual catches for non-QMS species, if only 5 000 tonnes of albacore is caught levy revenue would only be NZ$50 000. There would then be an under-recovery of revenue and albacore fishers would owe the Crown NZ$50 000 in under-recovered levy fees. This would be collected in the following levy year.

In contrast if the same fishery were in the QMS then basing the levy on quota shares would mean that NZ$100 000 would be collected irrespective of the catch taken. Each quota shares owner pays the levy based on the number of quota shares owned, not the catch actually taken or the total allowable commercial catch set.

Analyses of the previous years' under and over recoveries are carried out annually as soon as financial data becomes available. This is then consulted on with industry, and forms part of a revised levy order typically made six months into the fishing year. Under recoveries are charged through higher revised levies and over-recoveries through lower revised levies. Over and under recoveries are in effect charged against the fishery rather than individual permit or quota holders. This is not a major problem if under and over recoveries are identified quickly. This is the intent of the revised levy order. In some situations current permit and quota holders have incurred gains or costs from historical unders and overs. Under and over recoveries for a given fishstock can only be offset against subsequent levies for that fishstock. Bad debt (unpaid levies) are not treated as an under or over recovery and are collected from the individual levy payers who has failed to pay the levy.

This current treatment of unders and overs is the outcome of a long and complex process of first conflict and then co-operation between MFish and the commercial industry. This is described in a case study in Part Five of this document.

3.2 Private cost of fisheries regulation

Little formal study of the private cost of complying with fisheries management legislation has been carried out in New Zealand. SeaFIC in 2001 carried out a brief review as part of a submission to a Ministerial Panel on Business Compliance Costs convened to address the problem of excessive or unnecessary business costs arising from government legislation, regulations and interventions.

SeaFIC submitted that that excessive business compliance costs are not just a factor of how the Government delivers regulatory services but also how those services are specified and how responsibility for delivery is allocated. The seafood sector, SeaFIC claimed, experiences the costs of jurisdictional overlaps between departments, the consequences of vague and contradictory regulatory objectives and the burden of historic layers of regulations that are still being administered and enforced long past their 'use by date'.

Costs imposed on the sector by central government regulation have a major impact on the viability of the industry given:

- International competitors are often subsidized. New Zealand does not subsidize its seafood industry.
- The seafood industry's share of the world markets is small and there are many competing seafood products so the industry is unable to pass along increases in compliance costs to its international customers.
- The majority of Government costs associated with managing commercial fisheries are cost recovered from the commercial fishing industry.
- Mäori have significant interests in commercial fishing and compliance costs erode the value of fisheries-related Treaty settlements potentially leading to further grievances that hinder the development of the industry.

The major Acts regulating seafood industry activities are:

- Fisheries Act 1996
- Resource Management Act 1991
- Health and Safety in Employment Act 1992
- Animal Products Act 1999
- Maritime Transport Act 1994

Private management costs summarized in Table 6 include:

- Fisheries management costs including cost recovery charges and other charges under the Fisheries Act and the cost to the industry of being involved in the fisheries management process.
- Fisheries specific costs of complying with the Animal Products Act to ensure hygiene and food safety standards.
- Maritime Transport Act costs associated with safe ship management and crew registration.
- The indirect costs of complying with reporting requirements for areas such as research, fisheries compliance and safe ship management.

In many instances the costs of complying with regulations correlate closely with the costs of conducting good business practice. This includes many of the costs associated with complying with regulations under the Animal Products Act and the Maritime Transport Act.

SeaFIC submitted that government agencies should explicitly consider:

- The extent to which regulation is necessary to meet the purpose of governing statutes.
- Other non-regulatory means that may be used in achieving the purpose of governing statutes.
- The reasons for and against regulating over a particular issue.
- Carrying out an evaluation of the benefits and costs of the alternative ways of achieving an intended outcome and the likely implementation and compliance costs of the alternatives.

Table 6: Summary of the estimated fisheries specific compliance costs by statute in 2001

Legislation	Direct costs (NZ$millions)	Percent	Indirect costs (NZ$millions)	Percent	Total cost (NZ$millions)	Percent
Fisheries Act [(1)]	40	85	18	90	58	87
Animal Products Act	3	6	0.85	4.3	3.85	6
Maritime Transport Act	4	9	1.15	5.7	5.15	7
Total cost	47	100	20	100	67	100
	Port price (ex-vessel) value of harvest		NZ$750m	Fisheries specific compliance costs as percent of landed value		9

[(1)] Ministry of Fisheries levies, deemed values and DOC conservation services levy.

Source New Zealand Seafood Industry Council (2001)

3.3 Statutory funding of private fishery management costs

New Zealand's government recognizes that private costs can be incurred in "industry good" activities such as industry representation by professional staff during consultative processes. The Commodity Levy Act 1990 enables commodity based industry sectors to finance industry-good activities where voluntary funding would lead to a "free-rider" problem or would be impracticable. To raise a levy under the Act an industry group must first hold a referendum and gain 50 percent support of those responding and 50 percent by volume of production. An Order-in-Council can then be imposed on certain commodities making levies payable to organizations representing the views and interests of the persons primarily responsible for paying those levies. The levy is compulsory and all producers of the commodity must pay. The Commodity Levy Order lasts for 5 years. To renew or amend the Order a new referendum is required.

The Seafood Industry Commodity Levy came into force on 1 April 2002. The levy is used to fund core activities of SeaFIC, including:

- Policy issues affecting the New Zealand seafood industry.
- Promotion of the New Zealand seafood industry.
- Research, science and technical services relating to the New Zealand seafood industry.

A second, stock specific component of the commodity levy order funds stock or region specific commercial stakeholder organizations. These "second-tier" levies each had to be approved in the same manner as the core levy during the levy order referendum process.

3.3.1 Estimation of the levy

The levy is set against the port prices (ex-vessel price) for all commercially caught and produced fish, including fish produced from aquaculture. The port price is the simple average of independently surveyed prices paid for fish in each of the last three years. The port price is established by an independent survey of the prices that would be paid during each 12 month period for the by an independent processor buying from an independent fisher or fish farmer. Where survey data is inadequate an estimate is made. Port prices are based on the best available information known to SeaFIC.

3.3.2 Levy rates

The levy is calculated in two components. The core services levy that funds the generic industry services provided by SeaFIC in its Business Plan is set at a rate of 0.525 percent of the port price. The second component of levy in a number of cases is the stock specific levy. This is a levy to be collected to pay for projects mandated by levy payers for the stocks which are so levied and will purchase projects related to those stocks to be undertaken by commercial stakeholder organizations that represent those fish stocks as shareholders in SeaFIC. The maximum total levy that is permitted in the levy order is 5 percent. The maximum levy that has been set in all cases is less than the maximum.

4. PATTERNS AND TRENDS IN PUBLIC FISHERIES MANAGEMENT FUNDING 1985 TO 2004

Part Four explores patterns and trends in fisheries management funding for the 15 years from 1990 to 2004. It had been hoped to obtain comparable data for the full 20 year period 1985 to 2004 but this was not possible due to the way in which information was recorded prior to 1990. Particular emphasis is placed on the era of cost recovery from 1994 to 2004. The analysis is limited by several factors:

- The availability detailed expenditure data prior to 1994.
- The creation of the Ministry of Fisheries in 1994/95 that created abnormal spending patterns during its creation and also changed the way in which fisheries management costs were accounted for.
- Changes in outputs and output class specifications that make consistent reporting of expenditure trends difficult prior to 1999.

Nevertheless the information available demonstrates some interesting trends.

The following sections look at:

- Overall trends in public fisheries management expenditure 1990 to 2005
- Relative trends in fisheries management expenditure and industry cost compared to overall government spending.
- Trends in cost recovery levies and differences between levy orders pre and post consultation over the nature and extent of fisheries services.
- The makeup of fisheries management expenditure.

Unless otherwise stated all financial data is adjusted for inflation using the official consumer price index with 1985 as the base year. Financial data is therefore recorded as 1985 dollars.

4.1 Overall trend in fisheries management expenditure 1990 to 2004

Fisheries management expenditure from 1990 to 2005 is shown in Figure 3. The trend is for a decline in management costs from 1990 to 1994/95 followed by an increase after 1994/95. The reason for the decline in expenditure from NZ$33 million to NZ$22 million is between 190 and 1995 is unclear. It is likely to be associated with the creation of a standalone Ministry of Fisheries and the commercialisation of fisheries research services into a standalone Crown Research Institute thus significantly reducing overheads for the new Ministry of fisheries.

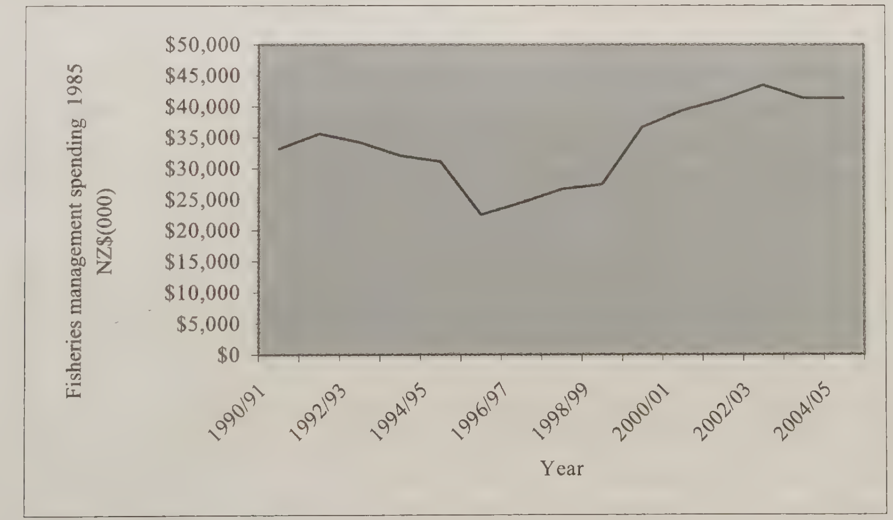
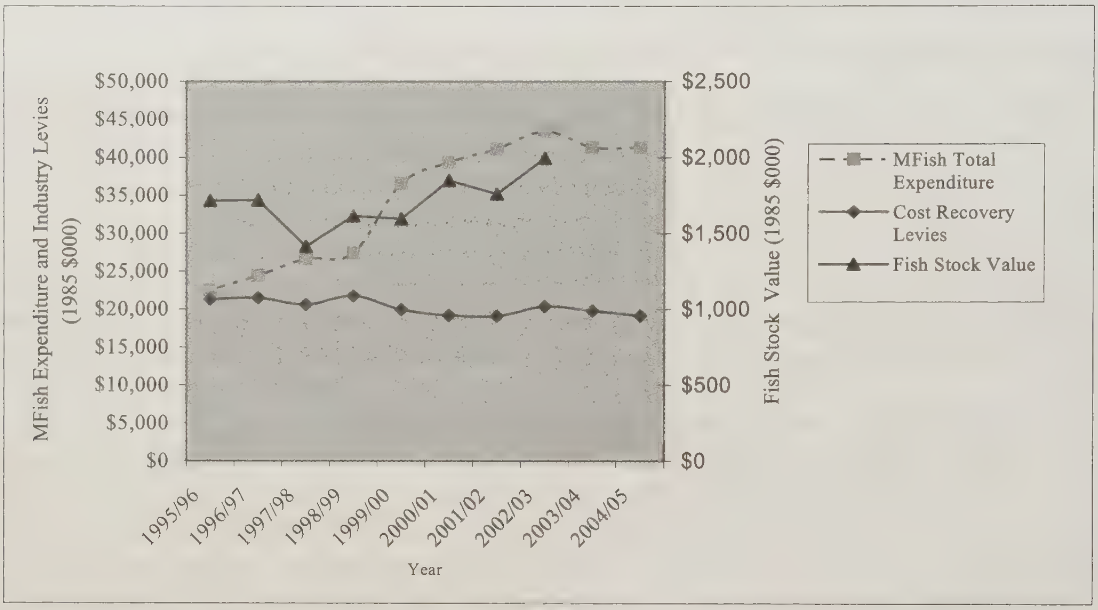


Figure 3: Fisheries services expenditure 1990 to 2005

MFish expenditure increased rapidly from 1995/96 to 2001/02 from NZ$22 million to NZ$40 million, and then stabilized at around NZ$41 million in the period 2001/02 to 2004/05. This stabilisation in inflation adjusted expenditure coincides with the delegation and devolution of registry related functions to the commercial industry. This may in part explain the stabilisation but another contributory factor is the stabilisation of the fisheries management regime that occurred when the full Fisheries Act 1996 finally came into force in October 2001. Many of aspects of the new Act allowed for administrative simplicity compared to previous statutory requirements. Moreover MFish was not compelled to work under a dual regime where some management functions occurred under the Fisheries Act 1983 and some under the Fisheries Act 1996.

4.2 Relative trends in fisheries management expenditure and industry cost recovery

Figure 4 shows trends in MFish expenditure and cost recovery levies during the era of cost recovery from 1994/95. It also shows the estimated total value of New Zealand's commercial fish stocks based on quota value. Unlike total MFish expenditure, commercial cost recovery levies have remained constant at between NZ$19 million and NZ$22 million since 1994/95. This compares to a steady increase in the overall asset value of New Zealand fishstocks.



Source: MFish (2005); Statistics New Zealand (2005)

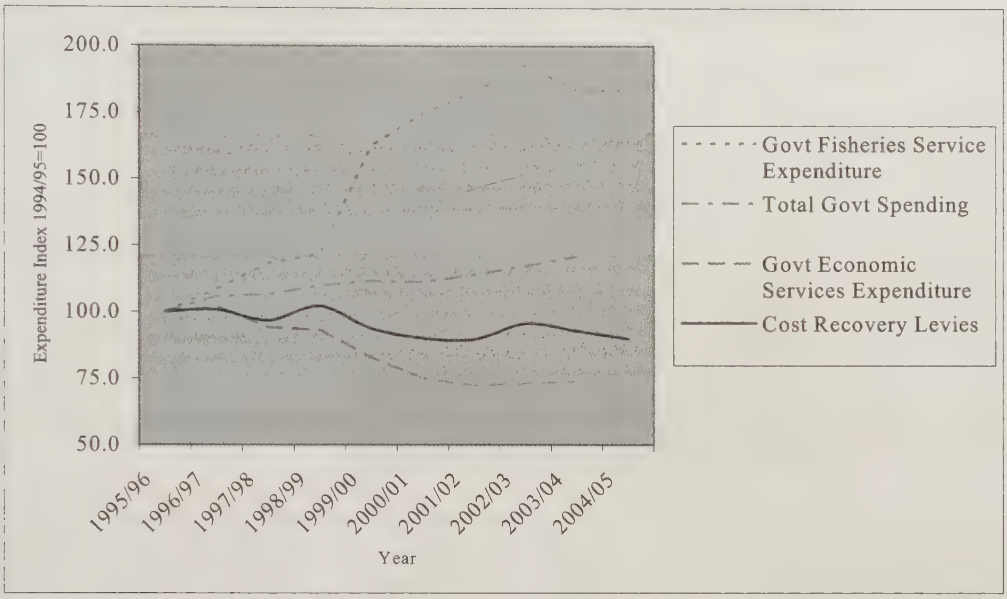
Figure 4: Fisheries expenditure and cost recovery levies 1994/95 to 2004/05

The first half of the period saw recovery costs hover around NZ$21 million and then decline towards NZ$19 million from 2001 through 2004. This slight decline in levies is partially explained by the devolution of quota registry functions to FishServe. This adds approximately NZ$1 million per annum back into the industries statutory contribution to public fisheries management costs. The costs of devolved services are directly charged to industry by FishServe.

Figure 5 provides an indexed comparison of changes in MFish expenditure and cost recovery levies with the change in total Government expenditure and in like Government agencies for the period 1994 to 2004. MFish is classified as an economic services department for public finance purposes. Like departments include the Ministry of Commerce and Ministry of Agriculture and Forestry.

Total Government expenditure on fisheries service has increased dramatically compared to changes in overall government expenditure. The difference in overall trends is even more marked when compared to other like agencies. Overall government expenditure increased by 21 percent in inflation adjusted terms between 1994 to 2004. Expenditure in similar government services fell by some 23 percent as government continued its policy of less direct intervention in the economy. In contrast MFish expenditure increased 85 percent in this time period.

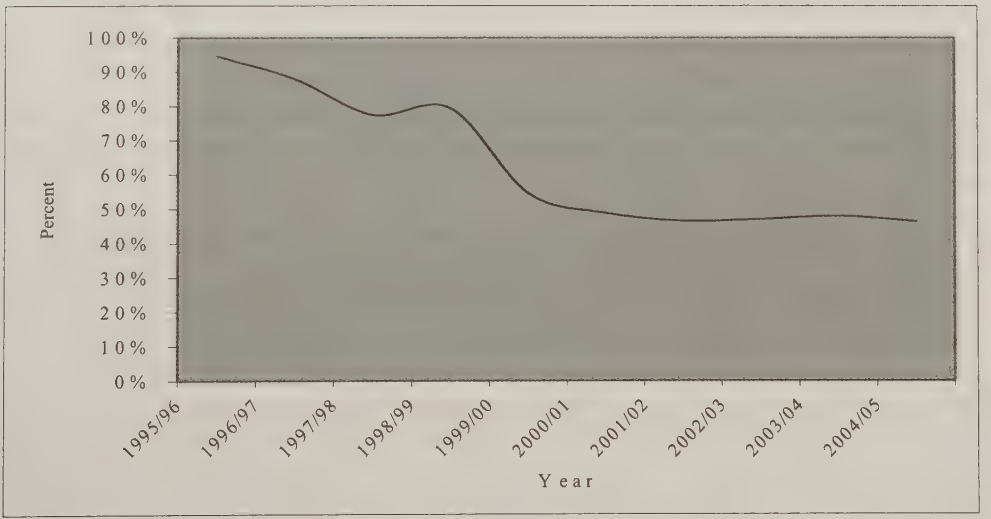
This trend suggests that fisheries management overall became more complex and more expensive in the period 1994 to 2005. Addressing this complexity was supported by Government Ministers through increases in the total MFish budget and approval for the hiring of additional staff to work on non-commercial fisheries management issues. The fact that cost recovery levies stayed relatively constant and most closely reflected changes in expenditures in similar economic service agencies indicates that the direct costs of commercial fishery management did not increase during this period and saw many of the efficiency gains evident in other government agencies. Rather expenditure increases have been due to non-commercial drivers such as biosecurity issues (now no longer part of he MFish outputs), recreational and customary fisheries management, non-commercial fisheries related research and the detection of illegal black market and poaching activities.



Source: MFish (2005), Statistics New Zealand (2005)

Figure 5: Indexed comparison of MFish expenditure, industry levies, total government spending and government economic services expenditure

This view is supported by Figure 6 that shows industry cost recovery levies as a percentage of total MFish expenditure from 1995/96 to 2004/05. Assuming that the data is accurate cost recovery levies declined as a percentage of overall Ministry expenditure funding between 1995/96 and 2001/02. It has remained relatively constant since 2001/02. MFish (2004a) is predicting a further fall to 38 percent for the 2005/06 year.



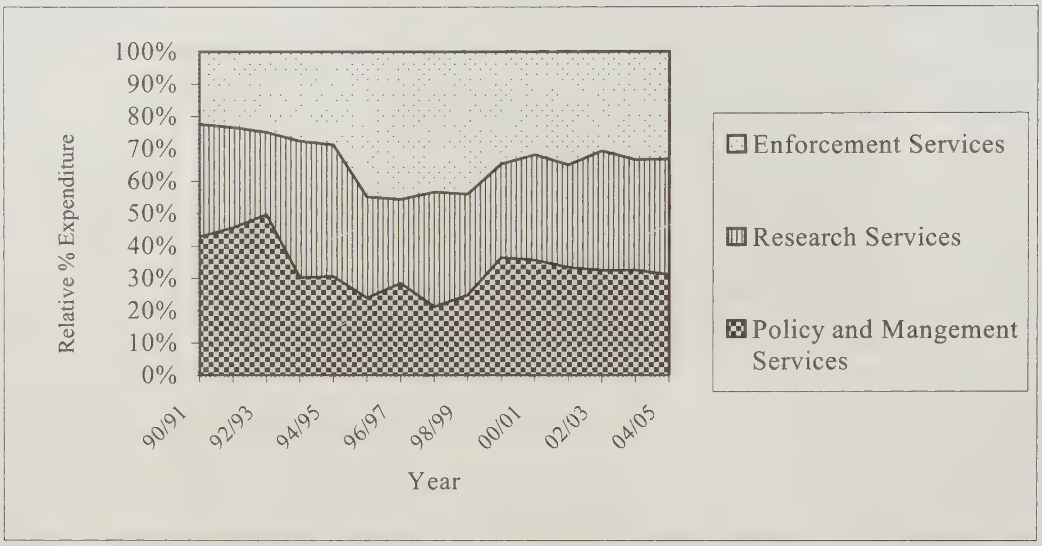
Source: MFish (2005)

Figure 6: Industry cost recovery levies as a percent of total MFish expenditure

4.3 The make up of fisheries management expenditure 1990 to 2004

Data limitations and changes to the way MFish and its predecessors defined outputs and output classes mean that for the entire period 1990 to 2004 publicly funded fisheries services can only be separated into three categories (Figure 7):

- Fisheries management and policy.
- Fisheries research and monitoring.
- Fisheries enforcement and prosecutions



Source: MFish (2005)

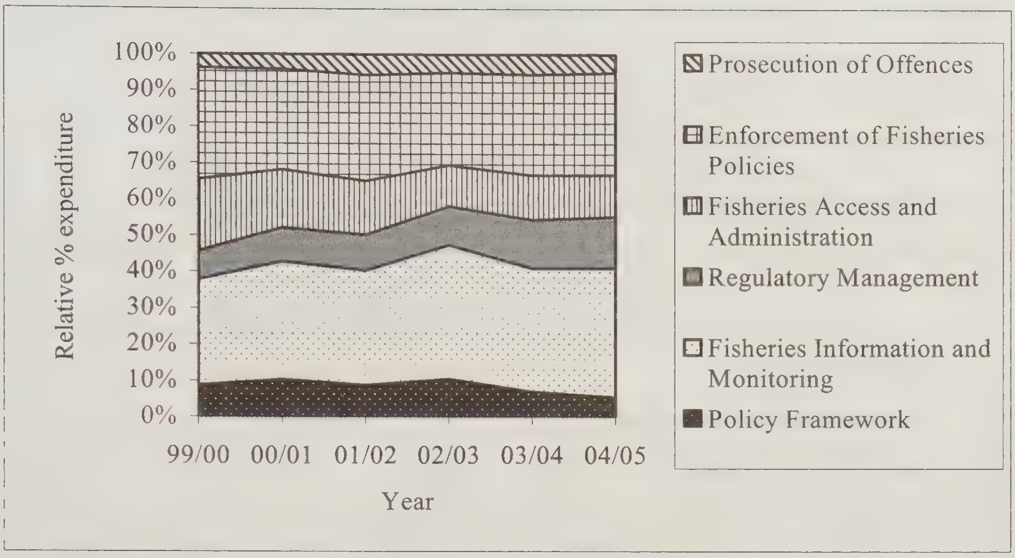
Figure 7: General fisheries outputs as a percent total MFish expenditure 1990/91 to 2004/05

Few overall trends are evident from Figure 7. Research spending as a proportion of total management expenditure as remained more or less constant. The fall in the relative proportion of policy and management services spending in the mid 1990s probably reflects the:

- Creation of the standalone Ministry of Fisheries that took time to define its policy and management outputs.
- Implementation of a new Fisheries Act that added to challenge of defining policy and management outputs.

At the same time research and compliance services were largely unaffected by the administrative and legal changes. Since the 1996 Act became fully operational 2001 the relative proportion of spending in the output classes has stabilized.

Figure 8 shows a more detailed breakdown of fisheries services for 1999/00 to 2004/05. A more detailed breakdown is possible for this period since MFish publish a reconciliation of changes to output classes and outputs. Overall expenditure within the six output classes has been relatively consistent with few trends apparent. The policy framework output class has declined due to a restructuring of MFish operations to focus more on regulatory management following the full implementation of the Fisheries Act 1996. Fisheries access and administration output class has declined relatively to other classes with the delegation and devolution of many functions to FishServe. Fisheries information and monitoring and fisheries enforcement are the largest output classes in terms of expenditure. They have remained relatively constant as an overall proportion of MFish expenditure of the five-year period. At least in terms of service delivery, MFish appears to be in a mature phase with few major changes.



Source: MFish (2005)

Figure 8: Fisheries service outputs as a percent total MFish expenditure 1999/00 to 2004/05

This situation will change for 2005/06. MFish has a new initiative to increase enforcement capacity including taking a multiagency approach to protect paua (abalone) and rock lobster stocks from poachers (MFish, 2004a). This will see a NZ$5.3 million increase in the poaching and black market detection output. These actions include monitoring, detection and provision of recommendations to prosecute. Enforcement will therefore make up a bigger proportion of MFish expenditure form 2005/06 than it has in the past. The driver for this increase is a recent marked increase in organized crime groups poaching and selling paua and rock lobster to far eastern buyers through very elaborate criminal operations.

4.4 Summary

Fisheries management costs in New Zealand have risen in real terms far faster than general government expenditure or expenditures in similar sized and similar functioning government agencies. The drivers of this increase appear be non-commercial such as recreational and customary fisheries management demands, non-commercial fisheries and marine environment related research and the detection of criminal black market and poaching activities.

In contrast, the cost of managing commercial fisheries has stayed constant in real terms and fallen dramatically as a proportion of total MFish expenditure over the period of the study. This suggests the cost-recovery regime for commercial fisheries has been successful in delivering efficiency gains in the public costs of commercial fisheries management. Relative stability in real terms of the cost recovery levies since the introduction of the present regime in 2001 also suggests that it has been successful in giving certainty to commercial fishers about the level of cost recovery.

5. FUNDING AND COST EFFECTIVE FISHERIES MANAGEMENT: FOUR CASE STUDIES

The description of the historical development of the fisheries management regime in Section 2 and its current form described in Section 3 cannot fully describe two fundamental aspects of the funding of fisheries management in Zealand:

- The link between cost recovery, efficient service delivery and stakeholder involvement in managing fisheries resources.
- The administrative complexity of giving effect to the cost-recovery regime in a legally defensible, transparent and accountable manner.

This section uses four mini-case studies to illustrate further these key dimensions of fishery management and funding in New Zealand:

1. Cost-recovery and the specification of fisheries research services.
2. Efficiency gains from the devolution and delegation of registry services and from directly purchased fisheries services.
3. Conflicts over the translation of cost recover principles into operational rules.
4. Cost recovery and accountability: The example of unders and overs.

5.1 Cost-recovery and the specification and delivery of fisheries research services

MFish operates a comprehensive and integrated system of planning, purchasing and ensuring delivery of research services. Stokes *et al.* (2006) describe the following features of the process:

- Service delivery for decision making purposes (primarily through stock assessment results feeding in to annual sustainability decisions).
- Planning of future research service requirements.
- Incorporation of service requirements in to the MFish SOI.
- Cost recovery implications and research service procurement (tendering, evaluation, negotiation etc.).
- Service delivery evaluation and eventual feedback.

This is demonstrated in Figure 9.

The MFish research planning and evaluation framework is widely perceived as a good example of a collaborative consultation process that, relative to other cost recovery consultation processes, results in little conflict over the recovery of research costs. The process is structured around research planning groups. Some of the planning groups focus on individual or groups of fish species, and others focus on more general issues such as recreational fishing, marine environmental research, and socio-economic research. Each group discusses, evaluates and makes recommendations about research activities. Membership of the groups includes MFish staff, research providers, environmental organizations, customary Mäori, recreational, and commercial fishing interests.

The groups receive input from regional fisheries liaison committees on general fisheries research needs and more specific information on research needs from the stock assessment working groups (discussed below). The research planning groups are supposedly guided in their activities by strategic and medium term research plans and in turn input to the review of these plans. Planning groups must consider MFish's various business planning documents such as the SOI and Strategic Plan and policies being drafted or in effect.

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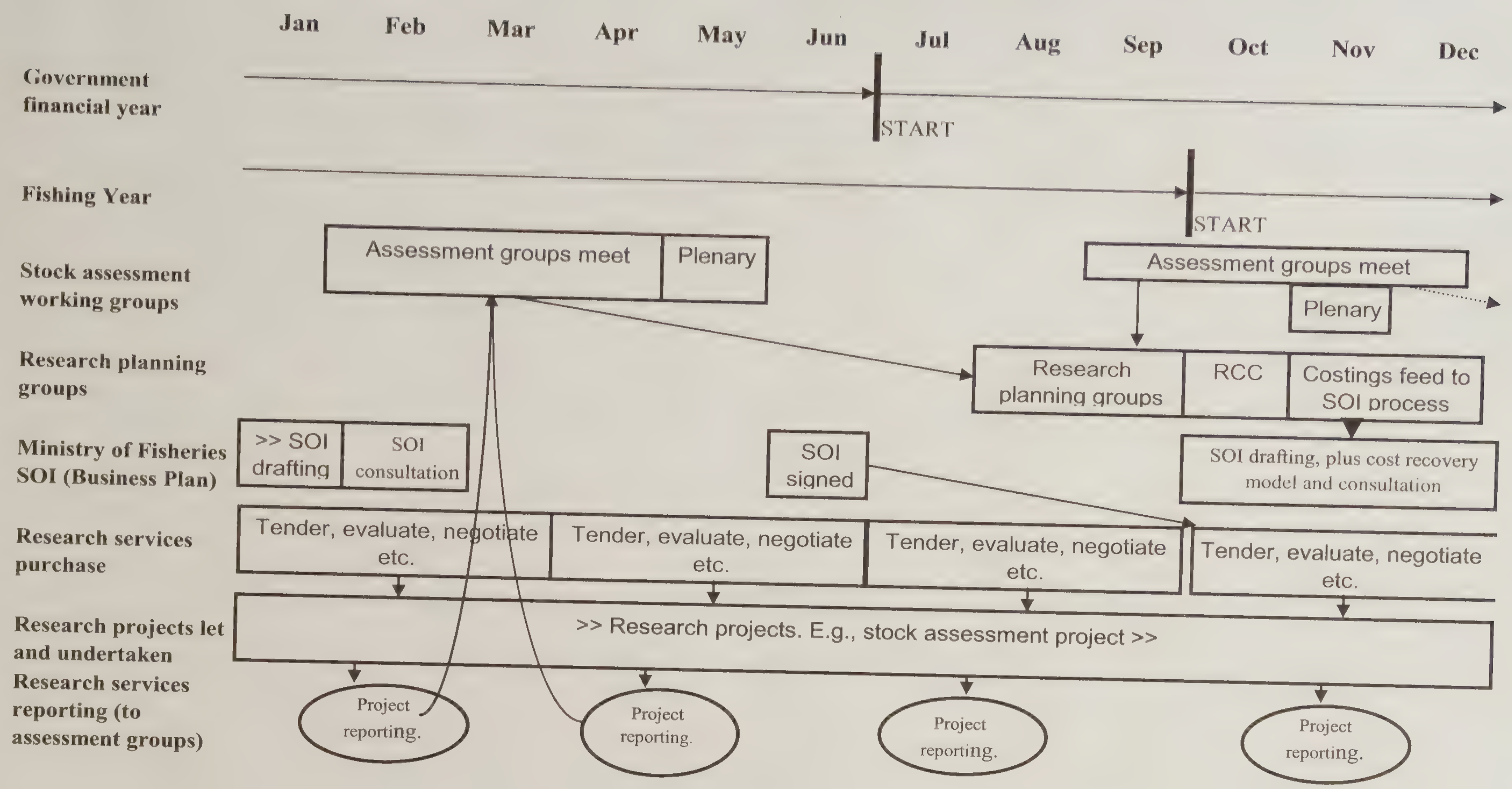
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Government financial year
START
Fishing Year
START
Stock assessment working groups
Assessment groups meet
Plenary
Assessment groups meet
Plenary
Research planning groups
Research planning groups
RCC
Costings feed to SOI process
Ministry of Fisheries SOI (Business Plan)
>> SOI drafting
SOI consultation
SOI signed
SOI drafting, plus cost recovery model and consultation
Research services purchase
Tender, evaluate, negotiate etc.
Tender, evaluate, negotiate etc.
Tender, evaluate, negotiate etc.
Tender, evaluate, negotiate etc.
Research projects let and undertaken
>> Research projects. E.g., stock assessment project >>
Research services reporting (to assessment groups)
Project reporting.
Project reporting.
Project reporting.
Project reporting.

Source: Stokes *et al*. (2006)

Figure 9: Processes involved in Ministry of Fisheries research planning

Proposals from the research planning groups are considered by the Research Co-ordinating Committee, made up of MFish staff, environmental organizations, customary Mäori, recreational, and commercial fishing interests. The Research Co-ordinating Committee (RCC) considers the recommendations of the planning groups and makes a final recommendation for operational research to MFish. MFish scientific staff provide cost estimates for the proposed projects. These estimates are integrated into the SOI consultation process for the coming financial year.

Stokes *et al.* (2006) discuss several impediments to the research planning process that have implications for cost recovery and which are only slowly being addressed:

- Few planning groups have medium term research plans and make little reference to other MFish strategic documents. This means that proposed projects cannot be judged in terms of their contribution to overall fishery management objects and therefore their benefit and cost-effectiveness is difficult to assess.
- There is not enough involvement of fisheries managers in the process and the majority of research projects are suggested by research providers who are driven by the need to raise research funds and continue existing research programmes rather than by the need to provide information for the management of fisheries.
- Until 2004 RCC was an informal meeting. Despite considerable input from the commercial industry on some projects that appear to have little additional benefit for fisheries management, nearly all projects tended to be included in the SOI. In 2004, the RCC became a formal consultative meeting and written submissions will require a formal response from MFish.

Table 7 shows proposed research services and their estimated cost for 2005/2006.

Table 7: Proposed MFish Direct research expenditure for 2005/06

Proposed fisheries research	NZ$000
Deepwater fisheries	1 775
Hoki and middle depth fisheries	6 682
Inshore finfish and freshwater eels	3 086
Shellfish fisheries	2 063
Non-commercial fisheries	1 761
Aquatic environment	1 815
Pelagic fisheries	683
Stock assessment methods	891
Other services	615
Data management	834
Total fisheries research	20 205
Proposed biodiversity research	1 835
Total proposed research	22 040

Source: MFish (2004a), p. 16.

There is also a related research evaluation process. Thirteen stock assessment working groups cover either individual species, or life-histories (e.g. pelagic), fisheries (e.g. inshore) or supporting activity (e.g. stock assessment methods). The main task of the groups is to estimate the level of sustainable harvest for each fish stock and to determine whether or not current total allowable catches and total allowable commercial catches are sustainable. Each group consists of MFish staff and where appropriate representatives from commercial, customary Mäori, and recreational fishing sectors and environmental organizations.

Private fisheries management costs are increasingly incurred in this process as SeaFIC and other industry-employed scientists participate in all these meetings. In some cases large commercial stakeholder organizations have purchased parallel stock assessments to the MFish contracted ones, or collaborative research has occurred with industry purchasing additional scientific effort from SeaFIC or other science providers to work with MFish's primary research provider. From 1999 to 2004, commercial stakeholder organizations increased spending on research projects undertaken directly by SeaFIC from less than NZ$300 000 to over NZ$900 000 per year (Stokes *et al.*, 2006). This spending is additional to the "generic" science work funded under the SeaFIC Commodity Levy Order discussed in Section 2.

The stock assessment working groups prepare a fishery assessment report for each of the stocks in the quota management system. If new information indicates a change in the stock and a need to change catch levels, this is referred to the fishery assessment plenary for further consideration and consultation. If further research is required this is referred to the research planning groups described previously.

The outcome of the fishery assessment plenary is released as an advice paper to the Minister of Fisheries and forms the basis for adjusting harvest levels through a further sustainability measures process. The stock assessment recommendations are augmented during sustainability measures consultation by social, economic, cultural and environmental considerations.

Stokes *et al.* (2006) state that there are many instances when industry would have directly purchased work carried out under the MFish research services output from research providers. This would have avoided MFish overheads and large transaction costs. However, supposedly independent Crown Research Institutes, of which NIWA is one, have been unwilling to enter into contracts, fuelling industry claims that provider capture is preventing the efficient delivery of fisheries research service. Research providers in turn claim that their ability to offer free and frank advice would be eroded if industry directly purchased such research. This claim ignores the fact that industry has carried out a large number of privately funded research projects that have fed in to MFish fisheries management processes. These have included biological data gathering, stock assessments, adaptive management programme and mitigation measures for seabird and marine mammal by-catch.

Overall, however, research planning and stock assessment consultations tend to be less contentious than consultation on the nature and extent of fisheries services included in the SOI. Moreover, they are characterized by a significant degree of collaboration between Ministry of Fisheries staff, fishing sector representatives and other interests. Though deserving of more detailed analysis and noting the negative aspects raised by Stokes *et al.* (2006), several general observations can be made (Harte, 1999, 2001):

- They have clear purposes, the analysis of research needs and the health of fish stocks, that are not disputed by participants.
- They are based on scientific assessment or the need for scientific assessment, and hence, tend to be relatively objective. All stakeholders have a commitment to the scientific basis of fisheries management.
- Participants in both processes tend to be experts or well versed in the science of fisheries management. They share similar backgrounds and training and, hence, have a common understanding of issues being debated and the range of solutions available.
- The outcomes of both consultation processes are subject to further consultation. Disputes between stakeholders can be put off to consultation on the SOI which finalizes the research services to be purchase for the year.

5.2 Devolution, delegation and efficiency gains from industry purchased research and registry services

The 1998 Independent Review of the Fisheries Act 1996 contained many recommendations about the role of the Crown and the role of stakeholders. The reviewer recommended that the Act be amended to enable the Minister to devolve fisheries management functions to rights holders groups, provide for mandated quota owner associations in the form of commercial stakeholder organizations, and provide suitable compliance regimes for management functions devolved to quota owner associations. The 1999 amendments to the Fisheries Act and their subsequent administration go part of the way to implementing these recommendations.

5.2.1 Devolved registry services

As explained in Part Two of this paper, the Fisheries Act 1996 provides for the devolution of some fisheries services to external organizations that then have responsibility for both purchasing and ensuring the provision of the services, with the agreement of the Minister of Fisheries.

Registry services devolved to SeaFIC and provided by FishServe have been an unqualified success (MFish 1994b). FishServe, as explained in Part One, delivers both devolved and contracted registry management and fisheries data management services on a long term basis to MFish set standards. The annual cost of registry services to the industry has decreased annually from NZ$8.65 million in 2000/01 to NZ$5.76 million in 2003/04 (Table 8). The volume of data transferred electronically grew in the same period from 68 percent to 94 percent of all registry transactions.

The reasons for the success of FishServe are fourfold (Campbell, pers. comm., 2005):

- The Fisheries Act 1996, when all its provisions were fully implemented in 2001, provided for more streamlined administrative processes.
- Devolution has allowed FishServe to be a lot more innovative and less bureaucratic because it is a private sector company rather than Government agency and therefore has more operational flexibility to make changes.
- Industry has been prepared to invest in FishServe given that they own it, and consequently FishServe have been able to invest in new technology that brought about major efficiencies.
- Given industry ownership, all the incentives exist for FishServe to want to reduce costs. There is always the risk that if FishServe loses industry support, the industry would look elsewhere for devolved services.

Table 8: Cost of FishServe to the industry (nominal millions)

Year	Contract (NZ$)	Devolved (NZ$)	Total (NZ$)	Staff
2000/01	8.65	N/A	8.65	84
2001/02	5.65	1.98	7.63	82
2002/03	4.57	1.78	6.35	73
2003/04	4.12	1.64	5.76	69

Source: Gibbs, pers. comm.

5.2.2 Stakeholder purchased research and related services

The 1999 amendments to the Fisheries Act 1996 also provide for stakeholder purchased services (direct purchase). These are services that the Chief Executive retains accountability for but agrees to allow stakeholders to purchase directly. The costs of directly purchased services are then removed from the cost recovery regime. It was initially intended that some approved fisheries research services could be purchased directly by industry groups, thus avoiding high MFish overheads and giving the industry more responsibility for fisheries management. In late 2000 a new Minister of Fisheries became reluctant to delegate research responsibilities and direct purchase was officially "put on hold" before it was implemented.

Despite the Government's reluctance to devolve management responsibilities beyond registry services, two successful examples of stakeholder purchase and devolution of fisheries services exist. The Challenger Scallop Fishery and the Rock Lobster Industry Council are both successful models of delegated management .

5.2.2.1 Challenger Scallop Enhancement Company

The drivers behind the establishment of Challenger Scallop Enhancement Company (CSEC) in 1994 were:

- A desire by scallop quota holders to manage the fishery "privately" under the QMS to capture the systems full potential.
- To minimize free-riding by non-levy paying commercial fishers.
- To establish an ownership structure for collective capital investment in the management of the fishery. For example, the CSEC purchased a vessel at a cost of about NZ$1 million purpose designed for enhancement activities including spat collection and reseeding of scallops.

Challenger Scallop Enhancement Company formally agrees its fishery management arrangements with government through two agreements:

- A scallop stock enhancement plan approved by the government that sets objectives for and specifications for enhancement activities. It also includes reporting and audit requirements.
- An agreement with MFish about providing information that is scrutinized by MFish to determine whether the company's activities are resulting in sustainable outcomes for the fishery and the wider aquatic environment.

There is provision in this latter agreement for the MFish to approve specifications and standards for research and to audit the data collection and analysis. Furthermore, CSEC must consult with recreational fishers, customary Mäori fishers and environmental interests before providing the Minister with a set of annual harvest recommendations.

Although the company's annual harvesting plan relies on some government regulation, CSEC has greatly reduced the need for direct government involvement. For example, CSEC sets the total allowable commercial catch for the scallop fishery at an arbitrary level and manages lower actual catches each year by getting quota owners to lease a defined percentage of their quota to CSEC. The company holds these rights in trust not to be fished unless scallop availability warrants the release of some or all of the quota.

The main research programme carried out by CSEC to meet government information requirements for the scallop fishery is an 'annual abundance survey' of stocks. CSEC has improved the precision of this survey at least three fold since taking over responsibility from government for information delivery as a result of standards demanded from shareholders and fishers. The company needs the information for its business plan and to set levies, as well as to provide the scallop fleet with accurate data about the location of scallops. CSEC runs it own geographic information system for this purpose. In addition, the company commissions independent researchers to provide information on the possible environmental impacts of its scallop harvesting and the company's enhancement activities.

CSEC fisheries management activities are funded according to a business plan that is agreed at its general meeting and aligned with principles set out in its agreement with government. Quota holders in the fishery pay a levy based on their quota share holding, The matter of company performance is an organizational issue that is audited by the shareholders.

5.2.2.2 Rock Lobster Industry Council

The New Zealand rock lobster fishery is managed through the multi-stakeholder National Rock Lobster Management Group (NRLMG). Membership of the NRLMG comprises MFish, commercial, recreational and indigenous fisher representatives, environmental non-governmental representatives and science advisers. It is the a primary source of advice to Ministers on all rock lobster management issues. The marriage of the practical working knowledge of rock lobster fishers, the research and management experience of government agencies, and the expectations of other sector groups has been a successful and productive one (Metzner *et al.*, 2003).

Key to the success of the NRLMG is a commercial sector committed to the sustainable and inclusive management of the rock lobster resource. The New Zealand Rock Lobster Industry Council (RLIC) is an example of the potential that commercial stakeholder organizations have to succeed in a number of fields of fisheries management including research.

RLIC is an umbrella organization for nine commercial stakeholder organizations operating in each of the rock lobster management areas of New Zealand (Sykes 2000). These organizations have been established as incorporated societies or limited liability companies and are known as CRAMACs.

Membership of CRAMACs comprises quota owners, processors, exporters, and fishermen (owner-operators and lease holders) in each region. Governance is based on a two-tiered voting procedure that gives priority to quota ownership on issues affecting total allowable commercial catch decisions, levy setting, and certain government consultation processes. All nine CRAMACs hold a majority mandate of crayfish quota holders in the regions. CRAMACs are shareholders in RLIC and appoint the nine person board of directors, one from each CRAMAC.

Taking advantage of provisions in the Fisheries Act 1996, in 1997 RLIC became an accredited research provider to the Minister of Fisheries, and since then has successfully tendered for, and executed, a number of rock lobster stock assessment and related contracts. Research contracts are undertaken in collaboration with national science providers and internationally recognized stock assessment consultants contracted to RLIC. RLIC also uses accredited technicians employed by science providers and by CRAMACs to undertake an extensive stock-monitoring programme.

5.3 Conflict over the translation of cost recovery principles into operational rules

The current cost recovery regime introduced in 2001 based on the beneficiaries-pays and risk-creators pays approaches for the recovery of commercial management costs is a vast improvement on the previous cost recovery regime based on the avoidable cost principle. Nevertheless there remain several areas where there is contention about the translation of the principles into the cost recovery rules contained in Appendix II and their subsequent application.

The commercial industry's concerns fall into three categories (Gibbs, pers. comm.):

- Failure of the rules to ensure that "public good" research costs are not recovered from the industry. The industry perception is that this occurs due to rules that are not consistent with the principles and is exacerbated by poor application of the rules by MFish officials.
- The rules don't effectively enable spreading of costs in relation to environmental risk. For example some conservation service levies should be attributed by way of gear type rather than the stock fished as required by existing rules.
- Failure of some of the rules to fairly attribute costs on the basis of benefits received from services.

The third concern is the one that has received most attention. It relates to the use of the port price weighted index to apportion non-attributable costs such as the research, compliance and registry components of fisheries services. In the 2004/05 fishing year the port price index was use to allocate over half (NZ$18 million out of NZ$35 million) of cost recovery levies to fishers.

There are several reasons for the concern about using the port price index as a way of spreading the non-attributable costs of some fisheries services:

- Due to potential game playing in survey responses, the port price may not reflect the relative values of the fish stocks.
- There is a low response rate to the port price survey.
- There is much vertical integration in the fishing industry, so for some fishstocks there is no port or ex-vessel price only an export or processed value.
- There may be no link between the relative value of the fishstock and the value of the service being cost-recovered.
- The benefit received does not necessarily equate to the cost allocated.

In response to these concerns SeaFIC and MFish set up a joint working group to explore alternative methods for allocating non-attributable costs. The working group commissioned a study looking at alternative cost spreading indexes etc. The final consultant's report recommended replacing the port price index mechanism and defining all the services better, so that the costs can be properly attributed rather than spread using a proxy. The report recommended a cascading approach to cost attribution (Deloittes, 2004):

- Directly attribute costs to the maximum extent possible by transaction charges where individuals benefit, or by way of levy where the benefit is only definable by fishstock.
- Where direct attribution is not possible, place responsibility on the commercial industry to decide how to apportion costs.
- Where no consensus is able to be reached by the industry apply a default rule where the Chief Executive of MFish applies discretion to fit particular circumstances.
- Apply this process in an appropriate manner to research, compliance and registry components of fishery services.

For research services this means extending the research planning process discussed previously to include a decision on how costs for each project should be recovered. For example, for research project on a single stock direct attribution would be applied. For a multi-stock fisheries the recommendation agreed during the research planning process would be used if consensus were reached. If not the default of Chief Executive's discretion, after appropriate consultation, would apply.

For registry services not allocated by way of transaction charges, costs would be levied equally across all levy payers. Compliance costs would be allocated in a similar way to research costs. Industry would decide how to allocate these costs among themselves and if no consensus were reached, the default of the Chief Executive's discretion would apply.

Working group members liked this outcome, but the working group's final recommendations were put aside to be incorporated in the wider review of the rules that is planned for 2005. MFish (2004a) has indicated the reassessment of rules is likely to focus on fisheries management regulatory outputs and international fishing issues that, under the current rules, are not cost recovered. MFish also considers there is also scope for encouraging stakeholder participation by using cost recovery as an incentive for greater stakeholder involvement in fisheries management and service delivery.

5.4 Cost recovery and fiscal accountability: the example of the under and over recovery of cost recovery levies

As described in Part Three, the under or over recovery of levies occurs when more or less expenditure is incurred by MFish than original budgeted. It can also occur when more or less levy revenue is collected than was forecast. This latter situation can occur with non-QMS species where levies are based on forecasts of actual catches.

The Fisheries Act 1983 did not have an express requirement for the Minister to 'have regard to' unders and overs in previous financial years. However there was an express requirement under the 1983 Act for the amount recovered or recoverable under the levy order in force to be taken into account in the consultation process. No specific advice was provided to the Minister on unders and overs relating to setting the 1995/96 and 1996/97 levy order because MFish did not believe this was necessary under the 1983 Fisheries Act .

The Fisheries Act 1996 created mandatory obligation on the Minister of Fisheries to have regard to any under and over recovery of a previous year's levy order when setting a new levy order. Between 1997 and 2001 advice to the Minister in relation to the annual cost recovery levy order generally (MFish, 2003):

- Noted the industry's concern in relation to taking into account under and over recovery as expressed during the annual consultation process.
- Noted the progress of a joint working group on unders and overs (from 2000).
- Provided a specific recommendation that the Minister have regard to but not incorporate the under and over recovery into the levy order until the working group reported.

MFish advice to the Minister was based on the assumption that under and overs were a net amount, as required to be recorded in the Crown accounts under the Public Finance Act.

The commercial industry had maintained since the introduction of the cost recovery regime that the Minister of Fisheries failure to have regard to the under and over recovery of levies was illegal. In the latter half of 2001 proceedings filed in the High Court for judicial review raised doubts as to whether all the fisheries cost recovery levy orders from 1994 to 2001 were validly made. In particular, there was concern as to whether the Minister of Fisheries, in making the levy orders, had been provided with advice that allowed him to have sufficient regard to the under and over recovery of levies.

The Government sought validating legislation, with retrospective effect, to protect the Crown from a potential fiscal exposure of NZ$240 million (the total amount of levies collected under the levy orders in question). The validation was given effect through the legislation in 2002. This validated cost recovery levy orders from 1995 to 2001 by deeming the Minister:

- To have complied with the sections of the Act requiring regard to be had to under and over recovery.
- To have taken into account any other fees, charges, or levies paid or payable under the Act.

The commercial industry was dismayed by what appeared to be legalized taking of over-recovered levies, but the government had been primarily concerned with the need to mitigate the total NZ$240 million liability for all levies paid since 2004 rather than the liability for over-recoveries. The validating legislation, for example, did not actually remove the Minister's obligation to consider under and over recoveries when making new cost recovery levy orders. An amendment was subsequently made to the Fisheries Act requiring the Minister of Fisheries, when making the 2003/2004 levy order, to have regard to under and over recoveries in the years to which the validated levy orders related.

A joint working group comprising representatives of the commercial seafood industry and officials of the Ministry of Fisheries had been established as early as December 1999 to review the under and overs issue because of the industry's concerns.

The objectives of the working group were to:

- Determine the extent of the historic under and over recoveries of cost recovery levies since 1994.
- To develop a process for dealing with both the historical and future under and over recoveries.
- Make recommendations to the Minister of Fisheries on ways to finally resolve the issue.

Following the legal and legislative actions of 2001, the pressure on the working group to find a satisfactory solution to the unders and overs issue grew immensely. The working group reported in 2003 to the Minister of Fisheries with recommendations on a settlement process.

The unanimous recommendation to settle the 1994/95 to 2001/02 period was a package consisting of:

- A net credit of NZ$24.1m, for the under and over recovery of cost recovery levies for the period 1 October 1994 to 30 September 2002, to be applied against future levy orders
- An allowance of nearly NZ$500 000 representing the future time value of money, relating to the time the settlement will take to complete
- An agreement that the question of future deemed value revenue should be the subject of another joint working group made up of industry representatives and Ministry officials to be set up in 2003 and that it should report to the Minister of Fisheries.

The Minister of Fisheries accepted these recommendations.

The working group also agreed that a reduction of future levies was the most equitable way to distribute the settlement credits. Distribution would be made on the same basis as the initial allocation of the levy charges in the year in which the over or under recover was made. Table 9 shows the different components of the settlement.

Table 9: Financial elements of the unders and overs settlement (million NZ$)

Observer over-recovery	1.5
Research over-recovery	2.4
Departmental over-recovery	7.6
Revenue over-recovery	3.0
Conservation Services over-recovery	1.0
Transition quarter adjustment	7.5
2001/02 Net over recovery	1.1
Deemed values	0.0
Total	**$23.0**

5.4.1 Deemed values

Deemed values are an important part of the QMS's balancing regime. The balancing regime is the range of civil and criminal incentives that act to constrain commercial catch to the sustainability measures set under the Fisheries Act 1996. The regime acts on individual fishers to ensure catch is covered by annual catch entitlement (ACE) by monthly and annual balancing dates. ACE is generated once each year by quota shares of the total allowable commercial catch.

If a fisher catches an amount of fish in excess of his or her ACE, then he or she must pay a deemed value. Deemed values are the primary deterrent to taking fish that is not covered by ACE. If deemed values are not paid, a fisher's permit is suspended and fishing without a valid permit is a criminal offence. Deemed values are treated as non- departmental Crown revenue.

Annual deemed value demands made by MFish range from NZ$6 to NZ$7 million per annum prior to 1 October 2001, to an average of NZ$9 to NZ$10 million per annum in recent years. Until a 1999 amendment to the Fisheries Act that explicitly exempted deemed values from consideration by the Minister in setting levies, the industry asserts the Minister failed to have regard to millions of dollars of deemed value revenue received by the Government between 1994 and 2001. The Primary Production Select Committee agreed with this interpretation in its 1998 report on cost recovery as did the Independent Reviewer of the Fisheries Act.

Industry's reasoning is straightforward. Under the QMS balancing regime, fishers have a set time to buy ACE from quota holders if they do not hold enough ACE of their own to cover their catch of a particular fish stock. If they do not acquire ACE they pay a deemed value to MFish. Since they should have bought ACE from quota holders in the first place, and did not, part of the deemed value payments should be returned to quota holders in the relevant fishery. If the stock is overfished by non-ACE holders even if they all pay deemed values, it is the quota holders who face the risk of a cut in the total allowable commercial catch. This impacts both the amount of fish that can be caught and the value of quota shares.

As part of the agreement on the unders and overs issue Government agreed that a MFish and industry joint working group on deemed values should be convened. The working group is currently looking at the entitlement of quota holders to a proportion of revenues collected from deemed values. This work is progressing slowly due to a fundamental difference of views between MFish and the industry. MFish has long viewed deemed values as a punitive fine for failing to comply with the catch balancing regime. Industry views it as 'civil' charge intended to remove any financial benefit from catching fish without ACE. MFish is also insisting on involving non-commercial stakeholders in the working group on the grounds that they have a legitimate stake in the operation of the commercial catch balancing regime. Although this true, these same stakeholders have a record of being hostile to any change to the cost-recovery regime if it is in favour of the commercial sector and to be in support of changes that impose additional costs on the commercial sector.

6. LESSONS LEARNT AND CONCLUSIONS

Without a doubt the system of funding commercial fisheries management in New Zealand is successful in:

- Recovering the costs of fisheries management from the commercial industry.
- Improving transparency and accountability in the delivery of fisheries management services.
- Involving industry in both the determination of fisheries management services and in some instances the delivery of fisheries management services.
- Generating efficiencies in the delivery of fisheries services.

Nevertheless some difficult and costly lessons have been learnt over the last 20 years and some key questions about the future funding of commercial fisheries management remain.

First, it is not clear whether the New Zealand system of cost recovery is directly transferable to other fisheries management regimes around the world. For example, New Zealand's public sector reforms throughout the 1980s and 1990s were some of the most market oriented introduced anywhere in the world. The entire QMS was designed and implemented in this policy environment. Efficiency and cost-effective service delivery was a given for all public services. Fisheries management regimes with many of the following characteristics are the most likely to be successful in implementing a New Zealand style of cost-recovery:

- A general public sector ethos of transparency, efficiency and accountability.
- A clearly identifiable and commercial fishing sector.
- A system of fishing rights that have a high degree of durability and hence form the basis for attributing costs and collecting levies.

- Effective commercial stakeholder organizations that represent the commercial industry and can engage government agencies in constructive dialogue and negotiation over cost recovery.
- Government agencies that have strong policy and administrative capabilities.

With all the difficulties encountered in the development of the New Zealand cost recovery system it is perhaps unclear why successive Governments persevered with the system and did not replace it with an industry specific tax. Three unique factors may explain this:

- A general preference among the finance and treasury agencies for cost recovery rather than sector-specific taxes that are potentially punitive and inefficient.
- The Mäori fisheries settlement meant that major changes to the cost recovery regime could be seen as reducing the value of the settlement instigating a further grievance between Mäori and Crown.
- The continuity of senior MFish officials and industry representatives clearly dedicated to the success of the cost recovery regime and who were willing to put aside differences and work towards a common end.

Second, clear principles and cost recovery rules are required from the start of any cost recovery regime. The initial absence of any legislated cost recovery principles came close to destroying the integrity of New Zealand's cost recovery regime. Although some tension remains about cost recovery rules as currently legislated, their existence at least provides a foundation for ongoing constructive dialogue between the MFish and the commercial industry.

Third, the attribution of costs depends on the classification of services being in the public good or private good. The application of the beneficiaries-pays and risk-creator pays (a version of the polluter pays) approaches for the recovery of commercial management costs are increasingly difficult to apply as fisheries management agencies are faced with an increasing diverse and complex set of social, cultural and environmental concerns. To deal with these issues agencies hire more staff and develop more complex consultative processes, research programmes and management systems. There is a natural tendency to look to the commercial sector to contribute to the costs of these services under the risk creator pays principle. The beneficiaries pays principle is often harder to apply because the beneficiaries are either not identifiable as individuals or because it is politically unacceptable to recover costs from a particular group of people such as recreational fishers.

Fourth, accountabilities must be clearly defined and accepted by all parties. MFish was at best placed in a situation of potential conflict between its financial accountabilities under the Public Finance Act and the Fisheries Act and at worst used the Public Finance Act to deliberately avoid cost-recovery accountabilities under the Fisheries Act because of the costs and complexity involved. At the same time the commercial industry needed to accept that MFish was not accountable to it as the levy payer for the delivery of fisheries services no matter how good or bad that delivery was. MFish is accountable to the Minister of Fisheries. MFish must, however, provide an financial accounting of cost recovery to industry at a sufficiently detailed level so that it is transparent as to what services the industry is contributing to and whether the attribution of costs is consistent with cost recovery rules.

Fifth, designing and administering a cost recovery system based on cost attribution is complex and resource intensive. Engaging stakeholders in the process has high transaction costs for both participants and the management agency. Nevertheless not to engage stakeholders reduces the likelihood of acceptance of the attribution system and will do little to bring about efficiencies in the delivery of fisheries services since it tends to be the levy payers who have the greatest incentives to see efficiencies occur. The success of joint industry-Government working groups in resolving conflicts over the cost recovery regime further supports the need for fundamental engagement of stakeholders in the design and implementation of a cost recovery system.

Sixth, the use of cost recovery to drive efficiencies may be undermined by inertia within the fisheries management system. This arises from three sources:

- Active resistance to change from within an organization. Staff of any agency are unlikely to embrace sweeping changes especially if it threatens job security or causes the need for retraining or the acquisition of new competencies.

- The physical capability of the system to be changed. Modern management systems are interdependent functionally and hierarchically. Change to one management system has direct and indirect consequences for other parts of the system increasing the natural inertia of the system.
- The capabilities of the people within the system to change even when such change is accepted and desired. In highly competitive labour markets staff with appropriate skills may be scarce and/or expensive to hire. Furthermore, sweeping reforms require a change in mindset and in the competencies of existing employees that cannot occur in the short-term.

Combined these three factors limit the capacity of an agency to change management practices, and even when accepted it can mean change is evolutionary rather than revolutionary. Evolution rather than revolution characterizes the practice of cost recovery in New Zealand, even if its drivers have been and remain revolutionary.

Seventh, delegation, devolution and the general trend towards increasing complexity of fisheries management mean that the total cost of fisheries management is likely to continue to increase rather than decrease. Even as the public costs of commercial fisheries management have been stabilized and efficiencies attained, the private costs of fisheries management have increased. These costs arise from:

- Fisheries services devolved to the industry such as registry services.
- The direct purchase of fisheries services where the industry has formally or informally taken on greater responsibility for ensuring good fisheries management outcomes.
- The increased time and expertise needed to participate in MFish consultative processes as the decision stakes become higher and the range of issues addressed seemingly grows exponentially.

The future path of commercial fisheries management funding in New Zealand is unclear. The issue of attribution of management costs is now one of detail rather than fundamental debate. Efficiency gains in fisheries service delivery have occurred in many areas but the potential for more than incremental improvement is constrained by the need for public agencies to meet multiple objectives and respond to an ever increasing variety of issues and challenges. The cost recovery debate is shifting from the magnitude of the management cost to an ideological focus on the relative role of the Government and industry in the management of commercial fisheries.

The commercial industry and MFish consider the future lies in the development of fisheries plans (MFish, 2004a). Fisheries plans offer a way of making fisheries management more responsive to the needs of particular fisheries and the aspirations of the people who use them. By increasing stakeholder involvement, fisheries plans are expected to increase the level of innovation brought to fisheries management decisions. In situations where the Minister of Fisheries approves a fisheries plan, any associated MFish strategy will be updated to take into account the fisheries plan and avoid duplication or incompatibility of government services with services delivered by stakeholders.

Commercial stakeholder organizations would become increasingly responsible for developing fisheries plans that:

- Set management objectives and performance measures.
- Specify rules for management and governance.
- Define necessary services including: research, administration and management, and monitoring and compliance.
- Establishing funding arrangements.

The diversity of New Zealand's fisheries and marine areas means that fisheries plans will vary widely. Plans will evolve over time, and may begin with a limited set of objectives and management proposals then expand in scope and ambition as stakeholders gain experience. At their most ambitious, after developing a fisheries plan commercial stakeholder organizations could become responsible for:

- Managing decision-making processes.
- Purchasing research services.
- Administering access.

- Monitoring fishing activity.
- Providing information/education services.
- Enforcing non-criminal rules.
- Collecting levies to fund management activities.

The exercise of these functions would be subject to MFish developed standards and specifications.

The benefits of fisheries plans for the delivery of fisheries services include:

- Gains in economic efficiency due to lower transaction costs associated with stakeholder organization directly running and funding their own fisheries management services.
- Enhancement of commercial fishers stewardship ethic because they are directly involved in the purchase and execution of fisheries services rather than being indirectly involved through centrally run consultative processes.

Proposed as part of the independent review of the Fisheries Act in 1988 and provided for in amendments to the Fisheries Act in 1999, progress on fisheries plans has been impeded by a number of factors:

- Opposition by environmental non-governmental organizations and scientific interests who:
  - Believe fisheries service delivery is a core responsibility of government since fisheries are a public resource.
  - Claim that industry has a strong incentive to distort the results of research or compliance service outcomes or pressure contracted service providers for short-term gain.
- A perception by some segments of the fishing industry that fisheries plans meant devolution of management responsibility rather than the more simple delegation of service purchasing functions. This led them to oppose being accountable to the Ministry for the delivery of required fisheries services.
- An overestimation of the capacity of many commercial stakeholder organizations to fund and manage fisheries services orders of magnitude more complex than their existing service delivery responsibilities.
- An under-resourcing of the Ministry of Fisheries to develop necessary standards and specification, establish an effective monitoring and auditing regime, and manage the risks to government associated with stakeholder purchase of fisheries services.
- Insufficient collaboration between the fishing industry and MFish over the development of fisheries plan and the associated delivery of directly purchased fisheries plans.
- Changing attitudes of Government Ministers on the nature and extent of the devolution and delegation of commercial fisheries management services.

New Zealand is often looked to for lessons regarding fisheries management, especially those involving the use of market mechanisms to encourage the efficient use of fisheries resources. The history of New Zealand's cost recovery regime certainly contains many lessons about the construction of a principled cost recovery regime and the transparent and accountable attribution of costs to the commercial industry.

In the absence of a counterfactual it is difficult to measure efficiency gains attributable to the cost recovery regime. The decline in commercial cost recovery levies in real terms without any reduction in the quality of service provision suggests that considerable efficiency gains have been made, especially when viewed against increases in Government expenditure generally during the period reviewed. Significant increases in MFish expenditure, though attenuated in recent years, are likely attributable to the increasing complexity of fisheries management across commercial, recreational and customary fishing sectors generally.

Any jurisdiction considering implementing a comprehensive cost recovery regime should anticipate initial high transaction costs and perhaps a short-term reduction in efficiency. There is a need to implement new procedures and processes to ensure transparency and accountability. These will inevitably need revision and review in light of actual performance. Stakeholders will naturally demand a greater say in the delivery of services once they become responsible for their funding. At times it will be difficult to separate out behaviours intended solely to reduce industry costs in the short-term from those genuinely intended to improve the performance of management systems. Management agencies must be committed not just to the recovery of costs of fisheries management but to maximising the value derived from the sustainable management of a nation's fisheries resources through a suite of policy instruments, of which cost recovery is one.

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APPENDIX I: MFISH OUTPUT CLASSES AND OUTPUTS, 2005/06

Output class/output	**Explanation**
Fisheries policy advice	Outputs that ensure development and review of policy and legal frameworks for the sustainable and efficient utilization of fisheries.
New Zealand fisheries policy advice provided	Advice on policy development and to promote new frameworks aimed at: • Protecting the health of the aquatic environment. • Enabling New Zealanders to get the best value from the sustainable and efficient use of fisheries. • Ensuring the Crown delivers on its obligations to Mäori with respect to fisheries.
International fisheries policy advice provided	Contribute to the development of bilateral, regional and multilateral frameworks for managing international fisheries, with the aim of: • Protecting the health of the aquatic environment. • Enabling New Zealanders to get the best value from the sustainable and efficient use of fisheries. • Strengthening Governance arrangements for high seas fisheries.
Ministerial services provided	Drafting of reports and advice to Ministers and to Select and Cabinet Committees, replies to Ministerial correspondence and responses to Parliamentary questions.
Fisheries information	Research and other service outputs relating to gathering and analysing data about New Zealand's fisheries to support decisions about sustainable utilization, and the provision of information on the biodiversity of New Zealand's marine environment.
Utilization and sustainability of New Zealand's fisheries resources measured	As an input into current and future fisheries management decisions, fisheries research needs are identified, projects undertaken and results reported to provide increased information on: • Estimates of biomass and sustainable yields for fish stocks. • Effects of fishing on the aquatic environment, including biodiversity and bycatch species. • Relevant social, cultural and economic factors that may be included in the management decision process. • Non-commercial harvest levels.
Biodiversity of New Zealand's marine environment estimated	Supporting the New Zealand Biodiversity Strategy by identifying research needs, undertaking research and reporting research results in the following areas: • Biodiversity information within the New Zealand EEZ • Biodiversity of the Ross Sea, Antarctica
Observer services provided	Observers deployed and data collected
Fisheries management	This output class provides for: • Outputs that assist in developing guidelines, regulations and processes that make the fisheries policy framework operational. • Services associated with monitoring the effectiveness of delivery of contracted and devolved registry services to ensure consistency and compliance with contracted or devolved standards. • Management and dissemination of information received from registry agencies for use by the Ministry in managing other output classes. • A number of Ministry statutory decision processes.

New Zealand fisheries utilization and sustainability reported	Establishment of standards and the development of fisheries management advice contributing to the sustainability of aquatic ecosystems and efficient utilization of fisheries.
Deed of settlement implemented	Delivery of many of the services needed to fulfil the Ministry's Treaty and Fisheries Deed of Settlement obligations.
Cost recovery process managed	Determining and consulting on the fisheries management costs that are recovered from the commercial fishing industry.
Statutory decision processes administered	Evaluation of applications from stakeholders to harvest aquatic life or to farm aquatic life outside normal rules.
Registry services managed	Delivery and monitoring of contracted and devolved registry services to ensure consistency and compliance with standards and specifications.
Fisheries enforcement	This output class covers the outputs that promote compliance with fisheries laws.
Commercial fishing rules enforced	Compliance capacity provided to take action in commercial fisheries to encourage compliance and deter offending. These actions include monitoring, detection and provision of recommendations to prosecute.
Customary fishing rules enforced	Compliance capacity provided to take action in customary fisheries to encourage compliance and deter offending. These actions include monitoring, detection and provision of recommendations to prosecute.
Recreational fishing rules enforced	Compliance capacity is provided to take action in recreational fisheries to encourage compliance and deter offending. These actions include monitoring, detection and provision of recommendations to prosecute.
New Zealand's international fishing rules enforced	Compliance capacity is provided to take action in New Zealand's international fisheries to encourage compliance and deter offending. These actions include monitoring, detection and provision of recommendations to prosecute.
Poaching and black market activities deterred	Compliance capacity is provided to take action to apprehend poaching and black market offenders. These actions include monitoring, detection and provision of recommendations to prosecute.
Prosecutions managed	Fishery-related prosecutions managed. This includes case preparation and management of forfeit property.
Aquaculture settlement	Implementation of the aquaculture settlement in terms of theAquaculture Reform Act 2004.

Source: MFish (2004)

APPENDIX II: FISHERIES (COST RECOVERY) RULES 2001

FISHERIES (COST RECOVERY) RULES 2001

SR 2001/229

Silvia Cartwright, Governor-General
Order in Council
At Wellington this 10th day of September 2001
Present:
Her Excellency the Governor-General in Council

Pursuant to section 263 of the Fisheries Act 1996, Her Excellency the Governor-General, on the recommendation of the Minister of Fisheries under that section, and acting on the advice and with the consent of the Executive Council, makes the following rules.

Contents

1 Title
2 Commencement
3 Interpretation
4 Status of rules
5 Proportion of costs to be recovered from industry
6 Who must pay levies, and basis for levy
7 Allocation of costs between stocks for certain industry-wide services
8 Allocation of costs between stocks for observer coverage services
9 Allocation of costs for stock assessment research
10 Allocation of costs for aquaculture services
11 Alterations in levies during fishing year
12 Port prices
13 Revocation

Schedule
Apportionment of costs of fisheries and conservation services

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Rules

1 Title—

These rules are the Fisheries (Cost Recovery) Rules 2001.

2 Commencement—

These rules come into force on the day after the date of their notification in the *Gazette*.

3 Interpretation—

(1) In these rules, unless the context otherwise requires,—

Act means the Fisheries Act 1996

costs includes both direct and indirect costs

fisheries resources stock assessment research, in relation to any stock, species, or class of fish or fish resource, means research projects that aim to produce information on the stock structure, productivity, distribution, ecology, biomass, or sustainable yields of that stock, species, class, or resource

ICE means individual catch entitlement

inshore finfish—

(a) includes elephant fish, groper, red cod, rig, school shark, and snapper:

(b) does not include freshwater eels or blue cod

MHR means the monthly harvest return required by the Fisheries (Reporting) Regulations 2001

monitoring harvest levels means services to monitor the quantity and quality of data received from the reporting of fishing activity under the Act

pelagic fisheries resources includes albacore, jack mackerel, kahawai, skipjack tuna, southern bluefin tuna, kingfish (yellowtail), and other game fish species

permit holder means any person who holds a fishing permit issued under section 91 of the Act

port price means the surveyed average price paid by licensed fish receivers to independent fishers for fish landed to those licensed fish receivers, as set or updated under rule 12

QMS means quota management system

research relating to the protected species population means research required or carried out in the interests of the effective management of any species that is—

(a) protected under the Wildlife Act 1953 or the Marine Mammals Protection Act 1978; and

(b) taken as non-targeted species by commercial fishers

shellfish fisheries resources does not include cockles, paua, pipis, rock lobster, or tuatua

TAC means total allowable catch

TACC means total allowable commercial catch.

(2) In these rules, references to **stocks** includes, where appropriate, references to fishing activities undertaken for the purpose of harvesting those stocks and to the persons carrying out those activities.

4 Status Of Rules—

These rules are to be followed so far as reasonably practicable in setting any levies under the Act, but failure to accurately predict, estimate, account for, or otherwise quantify any matter referred to in these rules does not invalidate any levies set in accordance with their general tenor.

5 Proportion Of Costs To Be Recovered From Industry—

The proportion of costs to be recovered from the commercial fishing industry for the fisheries or conservation services specified in the first column of the Schedule is the proportion set out in the second column of that schedule.

6 Who Must Pay Levies, And Basis For Levy—

(1) The persons who must pay levies in respect of the fisheries and conservation services specified in the Schedule are, as appropriate,—

(a) quota owners, on the basis of the quota weight equivalent in relation to their quota share:

(b) ICE holders, on the basis of the amount of ICE held:

(c) permit holders, on the basis of the amount of actual catch of non-QMS stock reported on the holders' MHRs:

(d) fish farmers, on the basis of—

(i) the area of the relevant fish farm in hectares, in the case of costs for research services:

(ii) the number of licences, permits, or other authorisations held, in the case of costs for enforcement or other services.

(2) The levy payable for any fishing year on quota weight equivalent in relation to quota share, ICE held, or actual catch of non-QMS stock reported on a permit holder's MHR is to be calculated for each stock in accordance with the following formula:

$$\frac{g}{h}$$

where—

g is the total amount of costs to be recovered from the stock for the fishing year

h is the total TACC, ICE, or estimated catch likely to be extracted from the stock in the fishing year, as appropriate.

(3) Levies imposed on the persons specified in subclause (1)(a) to (c) may be expressed as a levy amount per tonne, per kilogram, or per quota share.

7 Allocation Of Costs Between Stocks For Certain Industry-Wide Services—

(1) This rule applies to the following services:

(a) the services specified in item 1 of the Schedule (which relates to monitoring and offence detection):

(b) the services specified in items 2 and 3 of the Schedule (which relate to protected species research):

(c) the services specified in item 4 of the Schedule (which relates to mitigation, etc, of effects of commercial fishing on the aquatic environment or biological diversity):

(d) the services specified in item 9 of the Schedule (which relates to the monitoring of harvest levels):

(e) the services specified in item 10 of the Schedule (which relates to administration and registry services).

(2) The percentage of the costs to be recovered from each stock in respect of the services listed in subclause (1) is to be determined in accordance with the following formula:

$$\frac{a}{b}$$

where—

a is the value of the particular stock, derived by multiplying the total TACC, ICE, or estimated catch for the stock by the port price for that stock

b is the total value of all stocks, derived by—

(a) multiplying the total TACC, ICE, or estimated catch for each stock by its relevant port price; and

(b) adding all the results.

(3) If, in the case of the services specified in items 2, 3, and 4 of the Schedule, the chief executive identifies particular stocks as risk exacerbators in all or any areas to which the services relate, then—

(a) the costs of those services in these areas are not to be recovered from other stocks; and

(b) the costs to be recovered in those areas from the identified stocks are to be determined in accordance with the formula in subclause (2) as if item b related only to the total value of those stocks identified as exacerbators.

8 Allocation Of Costs Between Stocks For Observer Coverage Services—

In respect of the observer coverage services specified in item 8 of the Schedule, the percentage of costs to be recovered from each stock is to be determined in accordance with the following formula:

$$\frac{c}{d}$$

where—

c is the number of observer seadays in the relevant fishing year or financial year or other relevant period attributable to the particular stock

d is the total number of observer seadays during that year or period.

9 Allocation Of Costs For Stock Assessment Research—

(1) In respect of the stock assessment research services specified in items 5, 6, and 7 of the Schedule,—

(a) the costs of services attributable to a single stock are to be recovered from that stock:

(b) where the services relate to more than 1 stock, the costs are to be recovered from each stock to which the services relate in accordance with,—
  (i) he formula in subclause (2), if the chief executive has determined a percentage allocation for the research effort in respect of the particular stock; or.
  (ii) the formula in subclause (3), if the chief executive has not determined such a percentage allocation for the stock.

(2) If, in respect of services that relate to more than 1 stock, the chief executive has determined a percentage allocation for the research effort in respect of a particular stock, the costs to be recovered from that stock are to be determined in accordance with the following formula:

$$\mathbf{c} \times \mathbf{d} \times \mathbf{h}$$

where—

c is the total cost of the services (before deduction of any Crown contribution)

d is the percentage allocation determined by the chief executive as reflecting the research effort in respect of the particular stock

h is the percentage of costs to be recovered from the particular stock, as indicated in the second column of item 5 or the second column of item 6 of the Schedule (whichever is relevant).

(3) If, in respect of services that relate to more than 1 stock, the chief executive has not determined a percentage allocation for the research effort in respect of a particular stock, the costs to be recovered from that stock are to be determined in accordance with the following formula:

$$(\mathbf{c} - \mathbf{e}) \times \mathbf{f/g} \times \mathbf{h}$$

where—

c is the total cost of the services (before deduction of any Crown contribution)

e is sum of any research costs allocated under subclause (2) to other stocks for the services concerned

f is the value of the particular stock, derived by multiplying the total TAC, ICE, or estimated catch for the stock by the port price for that stock

g is the total value of all the stocks to which the services relate (other than stocks for which an allocation has been made under subclause (2)), derived by—

(a) multiplying the total TAC, ICE, or estimated catch for each stock (other than stocks for which an allocation has been made under subclause (2)) by its relevant port price; and

(b) adding all the results

h is the percentage of costs to be recovered from the particular stock, as indicated in the second column of item 5 or the second column of item 6 of the Schedule (whichever is relevant).

10 Allocation Of Costs For Aquaculture Services—

In respect of the aquaculture services specified in item 11 in the Schedule, costs are to be recovered on the basis of—

(a) the area of each fish farm, in the case of the costs of research services:

(b) the number of licences, permits, or other authorisations held, in the case of the costs of enforcement or other services.

11 Alterations In Levies During Fishing Year—

If it is proposed to alter any levy during a fishing year, the altered levy may be set at a figure that, when averaged with the existing levy, results in an appropriate overall levy amount for the whole fishing year.

12 Port Prices—

Before 1 October in each year, the chief executive must survey the port prices for each stock and fix a port price that, in the view of the chief executive, is the average port price for that stock.

13 Revocation—

The Fisheries (Crown Contribution) Order 1999 (SR 1999/381) is revoked.

Schedule

Apportionment of Costs of Fisheries and Conservation Services

Services	Percentage of costs to be borne by industry	Allocation between stocks
1 Monitoring and offence detection of commercial fishing activities	100%	As in rule 7(2)
2 Research relating to protected species populations where risk to those populations by human intervention has been estimated	a/b , expressed as a percentage, where — **a** is the risk to the populations posed by commercial fishing in New Zealand fisheries waters. **b** is the total risk of human interventions on the populations	As in rule 7(2) or (3)
3 Research relating to protected species populations where risk to those populations by human intervention has not been estimated	50%	As in rule 7(2) or (3)
4 Services (including research) provided to avoid, remedy, or mitigate that portion of the risk to, or adverse effect on, the aquatic environment or biological diversity of the aquatic environment caused by commercial fishing	100%	As in rule 7(2) or (3)
5 Stock assessment research for stock for which a TAC and a TACC have been set	a/b , expressed as a percentage, where — **a** is the TACC for the stock **b** is the TAC for the stock	As in rule 9(1)(a)
6 Stock assessment research for stock for which a TACC or a TAC has not been set	The following percentage, as appropriate, for the stock being researched: (a) blue cod—40%: (b) freshwater eels—50%: (c) cockles, pipis, or tuatua— 25%: (d) paua or rock lobster—75%: (e) shellfish other than cockles, pipis, tuatua, paua, or rock lobster—90%: (f) inshore finfish other than freshwater eels or blue cod—75%: (g) pelagic fisheries other than kahawai and kingfish—95%: (ga) kahawai—70%: (gb) kingfish—50%: (h) seaweed—25%:	As in rule 9(1)

	(i) all other stocks not specified in paragraphs (a) to (h)—100%	
7 Stock assessment research across more than one stock	For each stock, the relevant percentage for that stock specified in this column in item 5 or item 6 (which percentage is to be applied to the stock's share of the costs determined in rule 9(2))	As in rule 9(2)
8 Observer coverage to support stock assessment process and conservation services	100%	As in rule 8
9 Monitoring harvest levels	100%	As in rule 7(2)
10 Quota and commercial fishing administration and registry services, including access and introducing new species into QMS	100%	As in rule 7(2)
11 Aquaculture services	100%	As in rule 10

Marie Shroff,
Clerk of the Executive Council.

The rules also indicate the basis on which levies are to be allocated to particular fishstocks or levy payers.

Date of notification in *Gazette*: 13 September 2001.

Date laid before the House: 13 September 2001.

FINANCING FISHERIES MANAGEMENT: THE GHANAIAN SITUATION

George Hutchful[1]

Hutchful, G., 2008. Financing fisheries management: the Ghanaian situation. In R. Metzner (comp.). Report of the Expert Consultation on Low-cost Fisheries Management Strategies and Cost Recovery, Georgetown, Guyana, 4–7 September 2007. *FAO Fisheries and Aquaculture Report*. No. 853. Rome, FAO. pp. 207–235.

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Organizational structure for fisheries management 216

ACRONYMS

APW	Ali Poli Watsa
CBFMC	Community-Based Fisheries Management Committees
CBLMC	Community-Based Fisheries Management Committees
DFMC	District Fisheries Management Committee
DGN	drift gillnet
DLMC	District Lake Management Committee
DoF	Directorate of Fisheries
EEZ	exclusive economic zone
EMC	Economic Management Committee
EPA	Environmental Protection Agency
FABS	Food and Agriculture Budgetary Support
FAO	Food and Agriculture Organization of the United Nations
FC	Fisheries Commission
FSD	Forestry Services Department
FSCBP	Fisheries Sub-sector Capacity Building Project
GCLME	Gulf of Guinea Large Marine Ecosystem
GDP	gross domestic product
GNCFC	Ghana National Canoes Fishermen Council
GNICF	National Inland Canoe Fishermen Council

GOG	Government of Ghana
GPRS	Growth and Poverty Reduction Strategy
GPS	global positioning system
GRT	gross registered tonnage
ICCAT	International Commission for the Conservation of Atlantic Tunas
IDA	International Development Association
IFMD	Inland Fisheries Management Division
IGF	internal generated funds
JICA	Japan International Cooperation Agency
KNUST	Kwame Nkrumah University of Science and Technology
MCS	monitoring, control and surveillance
MDA's	Ministries Departments and Agencies
MFRD	Marine Fisheries Research Division
MFMD	Marine Fisheries Management Division
MLGLDE	Ministry Local Government and Rural Development and Environment
MOFA	Ministry of Food & Agriculture
MOFEP	Ministry of Finance and Economic Planning
MOFI	Ministry of Fisheries
MSY	maximum sustainable yield
MTEF	Medium Term Expenditure Framework
NAFAG	National Fishers Association of Ghana
NGOs	Non-governmental Organizations
NICFC	National Inland Canoe Fishermen Council
NMA	National Maritime Authority
NORAD	Norwegian Agency for Development Cooperation
SAR	Staff Appraisal Report
SFLP	Sustainable Fisheries Livelihoods Programme
UCC	University of Cape Coast
UG	University of Ghana
UN	United Nations
UNCLOS	United Nations Convention of the Law of the Sea
VMS	Vessel Monitoring System
VRA	Volta River Authority
WB	World Bank
WRI	Water Research Institute

EXECUTIVE SUMMARY

This paper is the technical input of case studies from Ghana, into the Food and Agricultural Organization's initiative to provide practical information, knowledge and tools that will constitute a global blue print for cost effective fisheries management. It identifies the lead fisheries management agency and related institutions in Ghana; provides an overview of financing fisheries management in the country.

Currently the institutions responsible for fisheries management are: Ministry of Fisheries, Fisheries Commission (FC), Directorate of Fisheries as a technical secretariat to the FC, Community-Based Fisheries Management Committees. These structures collaborate with a wide variety of service providers including the Universities, other academic research institutions, Agencies, private consultants, local fisheries associations, other relevant Government Ministries, Departments especially those responsible for managing and regulating the nation's marine and inland water resources.

The Government of Ghana (GOG) is the most reliable and permanent source of funds for fisheries management. It provides funds from the national treasury, and allows the Fisheries management establishment to generate and use funds from regulation enforcement as well as user fees for certain categories of services and fishing in the nation's water bodies. Allocation of funds to the fisheries management goes through an elaborate process of consideration involving key institutions of the nation's governance including the presidency, parliament and the Ministry of Finance and Economic Planning.

Beyond Government sources, external sources comprising the nation's development partners constitute a very important source for financing fisheries management with the World Bank funded Fisheries Sub-sector Capacity Building Project (FSCBP), the IPIC project and the CIDA/DFID-funded Food and Agriculture Budgetary Support (FABS) as good examples.

Up to 2005, fishery sector management had been tacked under the Ministry of Agriculture. Decoupling fisheries management from the Ministry of Agriculture and the creation of the Ministry of Fisheries has enhanced the visibility of the sector, facilitated increased resource allocation from Government sources and resource mobilization from external sources, resulting in higher levels of fisheries management expenditures.

Funds from licensing of vessels and local resource mobilization by local fishing communities and District Assemblies as demonstrated by the IPIC project constitute examples of low cost sources of funding for fisheries management.

Overall, internally generated funding mechanisms such as licensing of vessels and use of participatory mechanisms in fisheries management, seem to be the way forward in low-cost fisheries management. In this respect, the reconstitution of the Fisheries Commission as stipulated in Act 625, and strengthening and expanding the coverage of co-management structures are recommended.

1. INTRODUCTION

Sustainable and effective fisheries management is a priority globally. In most countries, cost implications are very high and present a challenge to most practitioners. Fisheries management objectives must not only be met but also in a cost-effective manner especially in developing countries, where chronic funding shortages are the norm rather than the exception and very limited funds have to be shared between competing needs for a variety of activities such as research, policy making, operational management, enforcement and prosecution.

To facilitate informed choices between funding options by interested agencies, the Food and Agriculture Organization of the United Nations (FAO) has initiated a global effort to: examine funding issues; identify and document low cost approaches to meeting the most important fisheries management priorities; and provide practical information, knowledge and tools that will constitute a global blue print for cost effective fisheries management. In pursuit of this agenda, FAO has commissioned technical papers from selected countries including Ghana, to provide case studies that will input into the global analysis, report and tool formulation.

This paper presents the Ghanaian case study on financing fisheries management. It identifies the lead fisheries management agency and related institutions in Ghana; it provides an overview and critique of the various aspects of financing fisheries management in the country with focus on marine and the Volta Lake Fisheries; and, it draws special attention to World Bank funded Fisheries Sub-sector Capacity Building Project (FSCBP) – an intervention that reorganized and strengthened the institutional capacity for more effective fisheries management and established the Improvement of Policies and Institutions (IPIC) project – an example of a cost effective and self financing fisheries management scheme.

The paper is organized into four main parts. The first chapter introduces the purposes of the report. The second chapter presents an overview of key components and management agencies of the Ghanaian fisheries.

The third chapter presents the sources of funding, analysis of the financial performance and fisheries management service providers. The fourth part summaries the key issues and presents recommendations on the strategy for cost effective fisheries management.

1.1 GOAL

The goal of this technical paper is to facilitate the adoption of cost effective approaches to sustainable and effective fisheries management, globally.

1.2 PURPOSE

The purpose of this technical paper is to enable FAO to provide practical information, knowledge and tools that will constitute a global blue print for cost effective fisheries management choices by relevant agencies, globally.

1.3 OBJECTIVES

The immediate objectives of this paper are to:

- Contribute to the global effort at adopting cost effective approaches to sustainable and effective fisheries management; and
- Identify, illustrate and analyse current practices in funding/financing fisheries management by the key fisheries management agency and related institutions in Ghana and indicate relevant lessons learnt, in terms of cost-effectiveness.

More specifically, the paper seeks to:

- Document and explain the main characteristics of the Ghanaian fisheries;
- Identify the key fisheries management agency and related institutions in Ghana and describe its mandate, authority, and institutional structure;
- Provide an overview, and critique of various aspects of financing fisheries management in Ghana;

- Analyse and comment on changes in magnitude and composition of expenditures for fisheries management, reasons for such changes, relationship between sources of funds used and the efficiency with which they are used; and
- Describe actions that have improved the overall capability to meet fisheries management objectives including efficiency gains, and/or options to do so.

2. CHARACTERISTICS OF THE FISHERIES

The fisheries sector is important because the livelihoods of about 10 percent of Ghana's population are dependent on the fisheries resource. The sector is key to poverty reduction in the fishing communities as incomes of about 500 000 fishers and 1.5 million others in ancillary jobs are dependent on it. The fishing industry contributes 5 percent of the agricultural gross domestic product (GDP) and 3 percent of the national GDP (MOFA, 2004). Fish is the cheapest and most reliable source of animal protein for the average Ghanaian. It is also an important non-traditional export commodity with annual earnings of some US$100 million (Mensah *et al.,* 2003)

The fishing industry comprises aquaculture, marine and inland (Volta Lake) fisheries. Marine fisheries are predominant and account for about 85 percent of the annual fish production while the production from the Volta Lake principally accounts for the rest.

The country has a coastline of about 550 km and a narrow continental shelf (15-75m depth) with a total area of 24 300 km^2 or 11 percent of the country's territorial waters i.e. 218 000 km^2. The trawlable area extends to depths of 70 metres and covers 18 000 km^2. An untrawlable hard or rocky bottom exists beyond the 70 metre depth to the edge of the shelf.

The marine fisheries include the large pelagic tuna in the offshore waters inside the exclusive economic zone (EEZ) and beyond, and small pelagic and demersal fish species in the continental shelf area. Sardinella, anchovy and chub mackerel are the most important small pelagic fish species. The most important demersal fish species are of the families Sparidae, Pomadasidae, Mullidae, Scianidae, Lutjanidae, Serranidae, Pomadasidae and cephalopods.

2.1 TYPOLOGY OF MARINE FISHING FLEET

The marine fisheries are exploited mainly for commercial purposes by three categories of fleet. The fishing fleet are classified into: the artisanal, made up of indigenous canoes; the semi industrial wooden vessels; and the steel hulled industrial fleet. The industrial fleet is further categorized into distant water trawlers, shrimpers and tuna vessels.

A description of the crafts, trends in the development of the categories of craft and their implications for management are discussed below. The changes in fleet size of the various categories of vessels in the marine sub-sector from 1999–2006 are presented in Table 1 below.

Table 1: Number of Marine fishing vessels by types 1999–2006

Year	Canoe	Inshore	Industrial	
			Distant water trawlers and shrimpers	Tuna
1999	8 610*	239	37	33
2000	8 610	236	37	34
2001	9 981*	244	39	33
2002	9 981	230	39	33
2003	9 981	233	61	28
2004	11 219*	253	58	27
2005	11 219	240	62	27
2006	11 219	240	61	29
Comment on the fleet size over the period.	Increase	Stable	Increase	Stable

* Number established by census

Source: Directorate of Fisheries

Corresponding marine catch landings in tons by vessel types, location and fishing gear and value of catches for 1999–2006 are also shown in Tables 2 and 3 below. The level of biomass for the different fishery, i.e. pelagics, demersal and tuna species are presented in Table 4.

Table 2: Catch/landings of pelagic and demersal fish species 1999–2006 (metric tonnes)

	Canoe	Inshore	Distant Water	Tuna	Total (metric tonnes)
Depth Contour	0-50m (Costal / Inshore)	30-50m (Inshore)	50-75m (Inshore + Offshore)	75m offshore	
Harvesting method	APW, Beach seine, Set	Purse seine / trawl	Trawl	Pole & line	
1999	164 829	5 149	15 355	83 552	268 885
2000	275 965	8 688	16 679	53 255	354 587
2001	236 355	7 606	19 954	88 806	352 721
2002	200 769	7 785	15 408	66 046	290 008
2003	238 796	11 319	14 144	65 153	329 412
2004	267 910	6 331	15 422	62 742	352 405
2005	218 872	7 591	14 101	82 226	322 790
2006	231 681	9 877	18 807	63 252	323 617

APW: Ali/poli/watsa
Source: Directorate of Fisheries

Table 3: Value of fish landings 1999–2006 (Cedis x000)

Year	Canoe	Inshore	Distant Water	Tuna	Total
1999	597 957 982	18 680 614	62 652 598	243 937 924	923 409 118
2000	1 180 419 644	37 077 020	83 092 672	180 001 900	1 480 591 236
2001	999 782 750	54 217 179	121 758 227	400 315 679	1 576 073 835
2002	1 430 7779 945	56 048 760	116 775 646	531 671 105	2 135 275 456
2003	3 443 802 157	275 580 481	373 763 710	568 374 480	4 661 520 828
2004	3 616 782 030	87 160 605	404 058 480	941 128 950	5 049 130 065
2005	3 338 890 133	117 777 953	435 905 585	1 393 728 158	5 286 301 829
2006	3 938 570 608	173 144 250	651 824 045	1 170 170 140	5 933 709 043

Source: - Directorate of Fisheries

Table 4: Biomass of pelagic and demersal fish species 1999–2006

BIOMASS (MT)				
Year	Pelagics I	Pelagics II	Valuable demersals	Tuna
1999	40 000	50 000	10 743	100 000 - 220 000
2000	56 500	61 000	26 032	120 000 - 240 000
2001	-	-	-	-
2002	73 000	52 000	16 876	190 000 - 220 000
2003	-	-	-	-
2004	68 000	37 000	17 219	190 000 - 220 000
2005	54 000	46 000	19 420	180 000 - 220 000
2006	57 000	37 000	18 010	120 000 - 200 000

Source: Directorate of Fisheries

2.1.1 Artisanal/canoe fishery (coastal)

The artisanal canoe fleet consist of 11 219 traditional wooden dugout canoes, about half of them motorized. The size of the fleet is normally established every other year through a canoe census. Despite the obvious fact that the fishery resources are optimally exploited except in the rocky shelf area, the number of canoes keeps on increasing. This is because there are no restrictions on the entry of new fishers into this sub-sector. The canoe fishers operate from nearly 300 landing sites in 200 fishing villages along the coastline six days a week throughout the year. The fleet employs a wide range of fishing gear which includes purse seines ("poli/watsa"), beach seines, drift gill nets (DGNs), and surface set nets including "ali". The fishers also use various forms of bottom set-nets, hook and line ("lagas"). The lagas and DGN fleet which operate beyond the 50 meter depth zone are well equipped with ice, food, and fishing aids like compasses, fish finders and Global Positioning Systems (GPS).

The artisanal subsector produces about 70–80 percent of the total annual volume of marine fish catch. This catch is made up of mainly small pelagic fish species – and to a lesser extent some valuable demersal fish species.

The increase in the fleet size over the period 1999–2006 and its attendant increase in number of fisherman have had a negative social implication as to levels of livelihoods while sustaining a fluctuating resource. Hence, a management regime has to be adopted and applied to protect the use of the resource(s) through the enforcement of bylaws governing the artisanal fisheries sub-sector.

The co-management approach through the Community-Based Fisheries Management Committees (CBFMC's), introduced during the implementation of the Fisheries Subsector Capacity Building Project (FSCBP) 1996-2002, created an awareness and empowered the fishers to take collective action to stop some destructive fishing methods in the artisanal fishery. This has to be strengthened to well manage the fisheries resources. This could be achieved with the support of the Local Government Authorities, i.e. District Assemblies, by imposing deterrent fines on recalcitrant fishers who infringe on fisheries regulations in the artisanal sector. Funds generated from such fines and licence fees could then be channelled to improve fisheries management.

2.1.2 Semi-industrial fleet (inshore)

These are locally built wooden vessels measuring 9–12 metres in length, number about two hundred and forty (240) and are fitted with 30–90 horsepower (hp) diesel engines. The operators use mainly light bottom trawls fitted without mechanical aids to exploit valuable demersal species like sole, shrimps, cassava fish, cuttlefish, burrito etc. throughout the year. They fish with purse seines during the upwelling seasons. They operate mainly in the inshore waters between 30–50 metres depth where they compete with the canoe fleet.

The semi-industrial fleet produces about 2 percent of the total marine catch. This is made up of the valuable demersal species caught in trawls and the small pelagics caught in purse seines during the upwelling seasons. Trends in numbers of operational fishing crafts in this subsector of the fishing industry seem to be stable. Landings however, since 2004 have fluctuated around a mean of 7 000 tonnes. Of late (2007), inshore fishing seems to be in distress as revenues accrued do not match expenses incurred in the operation of the vessels. The cost of sustaining the inshore fishery needs an integrated approach to alternative livelihoods and diversification of fishing gear which, in turn, calls for the introduction of more environmentally friendly methods of harvesting fish such as the use of trammel nets long line by the Management Agency (DoF).

2.1.3 Industrial fleet (offshore)

This is made up of sixty one (61) vessels with 30–200 hp diesel engines. These are large steel-hulled foreign-built distant water trawlers. Many of these vessels were displaced from their original fishing grounds in Angola, Namibia, Senegal and Mauritania because of the implementation of the United Nations Convention on the Law of the Sea (UNCLOS). Only Ghanaian nationals are allowed into this fishery.

Although these vessels frequently stray into shallow waters, they now are supposed to operate in Ghanaian waters between 50–75 metres deep. They account for about 6 percent of the total volume of marine catch, and the catch includes high value cephalopods that are frozen at sea for export.

The demersal stocks were over fished before the implementation of the Fisheries Subsector Capacity Building Project (FSCBP). However their biomass temporarily improved (Table 4) during the project when the trawlers were effectively removed from shallow waters of depth less than 30 metres. Naval patrols dedicated to patrolling fisheries have been discontinued because of lack of adequate operational funds after the project.

The apparent increase in fleet size and the decreases in landings from the industrial fisheries over the period (Tables 1 and 2) tends to imply overexploitation of fish stocks, especially demersal fish species such as cuttlefish and seabream. Management strategies to minimize the tendency to exploit resources beyond their optimal yields can be attained through the enforcement of fisheries laws and regulations.

Table 5: Catch per unit effort for categories of fleet

	Category of fleet			
Year	**Artisanal**	**Inshore**	**Distant Water**	**Tuna**
1999	0.124	0.298	78.785	236.611
2000	0.108	0.494	139.233	258.511
2001	0.142	0.408	180.222	379.513
2002	0.239	0.295	156.174	212.073
2003	0.294	0.501	123.856	256.508
2004	0.226	0.362	78.708	297.355
2005	0.186	0.280	112.559	357.500
2006	0.189	0.247	145.148	252.000

* Effort for all vessels but number of days at sea for industrial distant water and tuna fleet
Source: - Directorate of Fisheries

Monitoring and surveillance of vessels through the vessel monitory system (VMS) currently operational in Ghana is expensive but nevertheless an effective means of regulating the fisheries. Observer programmes on board industrial vessels for compliance monitoring have been introduced should be intensified to improve and sustain fishery management systems.

In 1999 pair trawlers were introduced into the country to operate on trial basis. They landed sea bream, cassava and burrito. Their operations have been suspended as at the middle of August 2007 as a result of their destructive operational nature. A fleet of 29 vessels uses either purse seine or the pole and line with live bait (anchovy) land tunas. The current exploitation level of Bigeye tuna is higher than the maximum sustainable yield (MSY). Yellowfin is maximally exploited while skip jack tuna is exploited below the MSY.

2.2 Inland fisheries

The inland sources of fishing include 90 lagoons with a total area of 40 000 hectares (ha); rivers; about 2 000 dug-outs, small and medium reservoirs and lakes covering about one million hectares – of which the Volta Lake is the predominant one covering about 900 000 ha or 348 192 km^2. Volta Lake has a shore line of 5 200 km, 400 km from South to North and mean depth of 19 meters. It accounts for 90 percent of the annual inland fisheries production.

There are about 1 232 fishing villages along the shore line of the lake with a total of about 24 025 planked canoes operated by a total of about 71 861 fishers (Braimah – Volta lake Canoe Survey 1998–1991). There are about 27 fishing gears being operated on the Volta Lake. The key ones are gill nets, cast nets, traps, "winch" net, (Purse seine) beach seine, hook and line and short length bamboo pipes. Prohibited nets and methods are "winch" nets, beach seine, "atidza", short length bamboo pipes and the use of obnoxious chemicals.

The target fish are tilapia, Chrysichthys and Synodontis which constitute about 80 percent of Volta Lake fish landings. The average yield of the Volta Lake has decreased from 46.8 kg/ha in 1976 to 32.6 kg/ha in 1998. Catch per unit effort has declined at a rate of 0.26 kg/boat/day. At present the number of canoes actively fishing is 17 274, a number which exceeds the 11 731 boats estimated to produce fish at maximum sustainable yield (Braimah – Volta Lake Fisheries Management Plan).

Table 6: Summary of characteristics of the fisheries - 2006

Harvester	**Aquaculture**	**Artisanal Canoes**		**Semi-Industrial**	**Industrial**	**Tuna**
		Inland	**Marine**	**MFV**	**MFV**	
Number	2000	24 000	11 219	240	61	29
Target species	Tilapia, catfish	Tilapia, catfish	Small pelagics, demersals	Small pelagics, demersals	Demersals	Large pelagics
Annual landings (tonnes)	1 000	40 000	231 681	9 877	18 807	63 252
Value of landings x000 000 Cedis	NA	NA	3 938 570	173 144	651 824	1 170 170
Location	Inland	Volta Lake	Coastal	Inshore	Offshore	Offshore
Harvesting method	Drag netting	Set netting	Purse seining	Purse seining / trawling	Trawling / shrimping	Pole and line/ purse seining

3. FISHERIES MANAGEMENT AGENCIES, THEIR MANDATE AND AUTHORITY

The fisheries sector is made up of the administration and the fishing industry. The regulation of the fishing industry is by the government currently through the Ministry of Fisheries, Fisheries Commission and its technical divisions; however global trends in fisheries management have influenced the adoption of the co-management approach since 1997.

Currently the institutions responsible for fisheries management are:

- Ministry of Fisheries,
- Fisheries Commission (FC),
- Directorate of Fisheries as a technical secretariat to the FC, and
- Community-Based Fisheries Management Committees.

The figure below shows the Organizational structure for fisheries management.

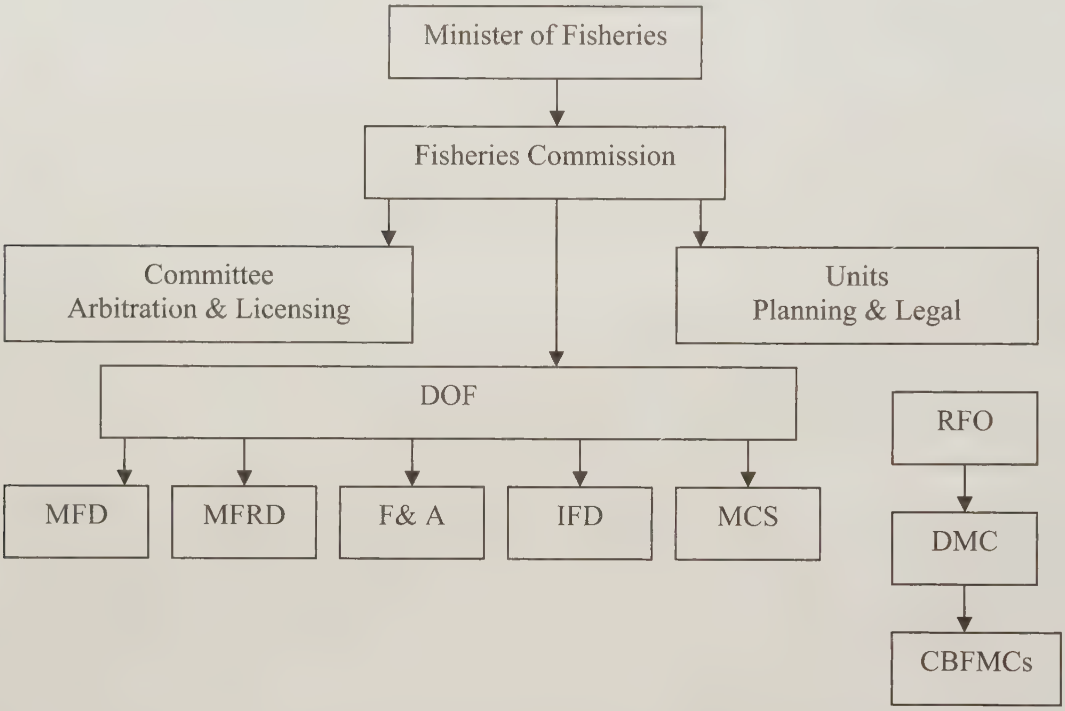

Figure: Organizational structure for fisheries management

3.1 Ministry of Fisheries

The Ministry of Fisheries is the over arching agency that gives policy direction for the growth and development of the sector. It is headed politically by a Cabinet Minister supported by the Chief Director as the administrative head.

3.2 Fisheries Commission

In 1993, by Act 457, a Fisheries Commission (FC) was established as an advisory body to the then Minister responsible for fisheries under MOFA. Act 625 of 2002 established a new Fisheries Commission which is more independent than its predecessor. The new FC incorporated the DOF as the technical secretariat for the management and development of Ghana Fisheries.

The objectives of the FC are:

- To regulate and manage the utilization of Fisheries resources

- To coordinate policies in relation to the management and utilization of these resources
- To ensure development of the fishing industry and sustainable exploitation of the fisheries resource and provide for connected matters.

Specific functions, among others, include:

- Preparation and annual review of fisheries development and management plans
- Conservation of fish stocks
- Monitoring Control and Surveillance (MCS) of the fisheries water
- Research and stock assessment of resources
- Ensure fish quality standards
- Cooperate with other relevant agencies in fisheries management.

As indicated earlier, the authority of the FC resides in Act 625 of 2002 which established the FC. The Act consolidates (with amendments) the Law on Fisheries to provide for more proactive fisheries management.

3.3 Directorate of Fisheries

The Department of Fisheries (DOF) was the sole agency for Fisheries administration from 1946–1993. It was established in 1946 as the key institution responsible for managing the fisheries resources of the country by provisions of Ordinance No. 20 Chapter 165 of 1945 of the laws of the Gold Coast now Ghana of 1945 (Chapter 165).

It functioned variously as a Unit, Division and Department under the Ministry of Food & Agriculture (MOFA) reflecting the progressive changes in its structure and function to cope with the development needs of the sector.

It is now the technical Directorate of the Fisheries Commission under the Ministry of Fisheries establishing and executing the government regulated fisheries management regime. The regime consists of scientific research feeding into the preparation of management plans for operational management and enforcement of the provisions of the plans and measures. The divisions in the DoF responsible for the management regime and their activities are presented below.

3.3.1 Marine fisheries research division

The function of the research unit is to collect, document scientific marine fisheries data and information for fisheries planning and management. Key activities are:

- Collect, collate, and analyse fish catch and biological data on samples of economic important marine fish;
- Conduct gear and canoe frame surveys;
- Monitor environmental parameters; and
- Stock assessment surveys[2].

3.3.2 Marine/inland fisheries management divisions

The functions of the two management divisions are to formulate and implement fisheries management plans. The key activities of the divisions are:

- Prepare and Review fisheries policy and management plans;
- Educate/disseminate and implement fisheries regulations;
- Facilitate formation, reorganization and training of Community and District Fisheries Management Committees;
- Facilitate development and gazetting of CBFMC bylaws; and

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[2] MFRD's inability to conduct its own survey is due to unavailability of research vessel MV KAKADIAMA.

- Training of fishers in alternative livelihoods strategies.

3.3.3 Monitoring, control and surveillance division

The function of the division is compliance monitoring and enforcement of Fisheries Law and regulations.

The key activities of the divisions are:

- Landing site/quayside/port inspection;
- Volta lake patrols;
- Observer mission for industrial Vessels at sea; and
- Monitor operation of industrial Vessels on the VMS.

3.4 Fisheries management service providers

Table 7 shows the principal agencies and stakeholders in the fisheries sector and their areas of focus.

Table 7: Principal agencies and stakeholders in the fisheries sector

INSTITUTION	SPECIFIC FOCUS
Ministry of Fisheries	Formulation of policy
Directorate of Fisheries	Research preparation of management plan and enforcement of laws and regulations
Food and Agriculture Organization	Technical assistance and assistance in human resource management
Ministry of Food and Agriculture	
Kwame Nkrumah University of Science and Technology	Research and training on resource management
University of Ghana	Research and training on fisheries resource management
University of Cape Coast	Research and training on fisheries resource management
National Fisheries Association of Ghana	Umbrella body of all the fisheries organization Advocacy and education on resource management
National Inland Canoe Fishermen Council	Advocacy and fisheries resource management on the Volta Lake
Ghana National Canoe Fishermen Council	Advocacy and fisheries resource management in the marine sector
Ministry Local Government and Rural Development and Environment	Decentralization and District Assemblies, passage of bylaws
Environmental Protection Agency	Protection of water and natural resources generally
Volta River Authority	Sustainable use of the Volta Lake and its resources
Ghana Navy	Patrol to enforce fisheries laws and regulations
National Maritime Authority	Inspection and certification of vessels
Attorney General's Department	Gazetting of laws and regulations and prosecution on infractions
National Development Planning Commission	Preparation of strategic plans focusing on poverty reduction
Ghana Harbors and Ports Authority	Coordination and management of ports and harbours
Ministry of Finance and Economic Planning	Provision of budgetary fund for implementation of programmes and projects
Ministry of Tourism and Diasporan Relations	Development of beaches for touristic attraction
Development Partners	Provision of Financial Assistance
Water Research Institute (WRI)	Collection and dissemination of data for resource management

4. FINANCING FISHERIES MANAGEMENT IN GHANA

This section provides an overview and critique of various aspects of financing fisheries management in Ghana. It discusses sources of funding, allocation of funds to fisheries management activities, fisheries expenditures, and financial information and indicators.

The main sources of funding for fisheries management are the Government of Ghana and Non-Governmental sources referred to as development partners.

4.1 Funding from Government of Ghana sources

The Government of Ghana (GOG) is the most reliable and permanent source of funds for fisheries management. There are two main Government of Ghana sources of funding for managing the nation's fisheries. These are funds from the national treasury referred to as the consolidated fund, and Internally Generated Funds (IGF).

4.1.1 Allocation of consolidated funds

Allocation of consolidated funds is based on national policy priorities. The current national development policies are expounded in the Growth and Poverty Reduction Strategy (GPRS) II 2006–2009 which aims at a per capita income of US$1 000 by 2015. In general, budgetary inputs of the Ministry of Fisheries are expected to contribute to the growth and development of the fisheries sector, as well as the long term sustainability of the fisheries resource.

A three year rolling Medium Term Expenditure Framework (MTEF) approach to budget preparation was introduced in 1999. It was adopted to execute policies, projects, and programmes of Ministries, Department and Agencies (MDAs). Each plan and budget indicates a logical framework comprising the following components: objectives, outputs, activities, verifiable indicators of achievement and Costs (inputs).

A national Economic Management Committee (EMC) meets yearly on or around May (at the beginning of the budget cycle) to review and update the macro-economic framework; develop proposals on 3 year ceiling for MDAs and submit proposals for cabinet for approval.

After cabinet approval, the Ministry of Finance and Economic Planning (MOFEP) instructs MDAs on the modalities for budget preparation along with approved ceilings.

In preparing its budget, the budget committee of the Fisheries Ministry reviews its current policy consistent with the GPRS II and prepares a strategic plan. The strategic plan sets out its policy priorities, operational plans for the first year of MTEF and indicative budgets for the second and third years. The strategic plan has three types of activities in consonance with the MTEF. These activities are administration (for which overhead costs for the operation of the office are allocated, including personnel service (for which funds are allocated for delivering goods and services to beneficiary users) and investment (for which funds are allocated for the construction and procurement of non-perishables).

The Ministry's fisheries management functions are comprised of: scientific research conducted by the marine fisheries research division; policy development and operational management executed by the marine/inland fisheries management divisions; and enforcement executed by the monitoring, control and surveillance division. Budgetary allocations to these fisheries management functions are allocated under the service activity of the strategic plan.

The finalized budget is presented to the EMC for onward submission through the MOFEP and, ultimately and after scrutiny, for approval by cabinet. Through the Minister for Finance, the President presents same to parliament for Appropriation Bill to be passed in November for implementation in January in the ensuing year. The Minister of Fisheries moves a motion in parliament as a last step for approval of the budget for eventual release of the funds for the activities.

The allocation from consolidated funds to the Ministry of Fisheries is presented in Table 8 below. On the average, the MOFI received approximately 0.05 percent of available funds from the GOG from 1999 to 2007. The leap in budgetary allocation from 2005 was result of the creation of the new Ministry of Fisheries after being decoupled from the Ministry of Food of Agriculture. Fifty percent (50 percent) of the allocated funds are actually released of activities (Table 9).

Table 8: Budgetary allocation to MOFA and MOFI from national funds (1999–2007)

Year	National (¢)*	Agriculture (¢)	Percent (%)	Fisheries (¢)	Percent (%)
1999	2 717 635 000 000	43 593 000 000	1.6	NA	NA
2000	3 295 404 000 000	62 232 000 000	1.9	1 880 804 673	0.05
2001	4 576 839 000 000	62 996 000 000	2.0	961 246 203	0.02
2002	4 533 601 000 000	102 688 000 000	3.0	816 378 411	0.01
2003	7 798 600 200 000	136 683 600 000	2.0	1 815 558 283	0.02
2004	10 513 179 900 000	142 707 000 000	2.0	1 843 586 814	0.02

Year	National (¢)*	Agriculture (¢)	Percent (%)	Fisheries (¢)	Percent (%)
2005	12 693 800 000 000	209 747 000 000	2.0	12 509 000 000	0.10
2006	17 912 094 900 000	256 910 000 000	2.0	15 840 000 000	0.08
2007	19 925 929 000 000	338 253 000 000	2.0	15 969 000 000	0.08

*Current Cedi equivalent to US$1 is ¢9,300 or GH¢ 93
Source: Government of Ghana Annual Budget Estimates

Table 9: Releases of funds

Year	Total approved budget	Releases	Ratio
2005	12 509 000 000	5 262 596 956	0.42
2006	15 840 000 000	8 075 421 950	0.51

Formal evaluation of expenditures and process for budget adjustment

Annual work plans and budget are formally submitted to Parliament for approval through the Parliamentary Select Committee on Food and Agriculture. The committee afterwards reviews the previous expenditures and approves the ensuing year's budget. Slight upward adjustments above the ceiling approved by MOFEP can be made if strong justification is made for it.

Use of independent advisors/participants

Extensive consultation of stakeholders is undertaken in the preparation of programmes and projects and in determining general cost e.g. Revision of Fisheries Law design of FSCBP and modus operandi for formation and empowerment of CBFMCs.

Stakeholders are consulted to determine costs in activities in which their services are required, e.g. CBFMCs. Close consultation on budget lines takes place when DOF engages in collaborative work with other institutions, e.g. WRI and UG, in fish life history studies and water quality studies on the Volta Lake.

4.1.2 Internally generated funds (IGF)

Internally Generated Funds (IGF) are funds that the Ministry of Fisheries generates from its service and regulatory functions. Before 2005, the IGF was paid into the consolidated funds, but is now considered as part of the Ministry's budget and has become an important source of operational funds.

The sources of IGF from services are: fees from the Ministry's boat service workshops; production and sale of fingerlings; and fish harvesting services. Sources of funds from regulatory functions are: fees from licensing of fishing vessels; levies on fish imports and exports; fees from access agreements; and fines from operators of fishing vessels contravening fisheries laws and regulations.

Of the aforementioned sources of IGF, Vessel licensing fees have proved by far the most important source of internally generated funds, contributing up upwards of 90 percent of internally generated funds. Vessel licensing fees became recognized as a potentially important source of revenue during the Fisheries Sub-Sector capacity Building project (1995–2000) based on the realization that fishers were taking so much from the national fishery resource base and putting in very little. Ever since, vessel licensing fees have increased progressively. Fees for industrial and semi-industrial vessels were raised from 0.05 percent mean value of catch in 1995, to 0.6 percent in 1996 and to 1 percent in 1997. Subsequently, fees were raised to US$2 per GRT in 1999 and then to US$5 per GRT in 2002.

Since 2003, vessel licensing fees have been tied to size of the vessel and the types of species of fish landed. Thus, trawlers up to 300 GRT pay US$30 per GRT/annum, whilst, those in excess of 300 GRT pay US$55 for every GRT in excess of the recommended 300 GRT. On the average each trawler pays about US$9 000 per annum. More specifically:

- Shrimpers up to 200 GRT pay US$40 per GRT/annum. Those in excess of 200 GRT pay US$70 for every GRT in excess of the recommended 200 GRT. On the average each Shrimpers pays US$8 000 p.a.;

- Tuna pole and line vessels up to 500 GRT pay US$25 per GRT/annum. Those in excess of 500 GRT pay US$47 for Every GRT in excess of the recommended 500 GRT. On the average, each tuna pole and line vessel pays S$12 000 p.a.; and
- Tuna purse seiners, up to 1000 GRT pay US$30 per GRT/annum. Those in excess of 1000 GRT pay US$55 for every GRT in excess of the recommended 1000 GRT. On the average each tuna purse seiner pays US$30 000 p.a.

Table 10: Fishing licence fees collected on yearly bases (Cedis)

Year	Industrial Vessels	Inshore Vessels	Total	Total Value (US$)
1997	206 560 000	–	206 560 000	91 804.44
1998	176 721 000	–	176 721 000	75 845.92
1999	729 138 000	–	729 138 000	208 325.14
2000	623 851 000	–	623 851 000	119 305.99
2001	546 511 000	20 552 000	567 063 000	78 431.95
2002	2 469 210 000	81 611 000	2 550 821 000	300 096.59
2003	7 001 109 000	110 699 000	7 111 808 000	812 778.06
2004	8 064 279 246	173 596 000	8 237 875 246	915 319.47
2005	8 710 492 310	101 933 000	8 812 425 310	979 158.37
2006	8 275 818 705	32 832 000	8 308 650 705	903 114.21
*2007	Gh¢ 492 680.45	Gh¢ 11 849.10	Gh¢ 504 529.55	

* 30th June 2007

From 1997 to 2006, license fees have increased from 206, 560 000 to 8 308 650 705 Cedis. License fees collected on yearly basis have exceeded US$800 000 since 2004.

Collection of licensing fees from canoes has not been carried out because of unwillingness of canoe operators to pay the fee. The management agency is till educating them on the need financially cost of fisheries management.

Revenues generated from internally generated funds are being used to service payment of a GB£3m Vessel Monitoring System (VMS) that was procured and installed in 2005 to track operations of industrial fishing vessels at sea.

4.1.3 Access agreements

The Ministry of Food and Agriculture formalized Access Agreements in 2003, and foreign fishing vessels now pay a fee to acquire fishing rights in Ghanaian waters for a defined period of time. Companies must pay an application fee of US$500 and processing fee of US$010 000 - in addition to the appropriate license fee.

4.1.4 The Fisheries Development Fund

For the future, it is expected that the IGF will be converted into Fisheries Development Fund as provide for in the Fisheries Act 625 of 2002. The Fisheries Development Fund shall be applied as follows:

- Towards the promotion and development of fisheries in the country;
- To meet the liabilities of the Commission in respect of the monitoring, control and surveillance of the fishery waters;
- To provide assistance to small scale fishery co-operative enterprises;
- To promote research and studies of the fishing industry; and
- Toward such other purposes as the Commission in consultation with the Minister may determine.

Sources of money for the Fund will consist of:

- Fees for licenses, permits and other authorization for fishing issued under the Act;
- Damages and costs granted by the courts to the State in respect of any action under this Act or Regulations made under the Act;

- Sums of money received for compounded offences;
- Proceeds of sale of forfeited items collected, imposed or received by or under the Act;
- Such amount of money that Parliament may approve for payment into the Fund; and
- Loans and grants.

The Fisheries Commission is to formulate policies to generate money for the Fund and determine, in consultation with the Minister, the allocations to be made from the Fund. However, since the Fisheries Commission as provided for in the Fisheries Act has not been reconstituted, the above conditions are yet to implemented.

4.2 Non governmental funds/development partners in fisheries management

Another source of financing fisheries management has been the support from development partners. Between February 1996 and December 2002, the World Bank funded project of US$10.5m provided extra budgetary funds for fisheries sub-sector capacity building to manage the sub-sector in terms of turning the tide against dwindling fish stocks in Ghana's marine and Volta Lake waters.

Other funding sources are the FAO/Nansen programme, the International Commission for the Conservation of Atlantic Tuna (ICCAT), Food and Agriculture Budgetary Support Programme and the Sustainable Fisheries Livelihoods Programme (SFLP) Pilot Project 1. The SFLP project provided an experience of low cost and effective financing system for fisheries co-management.

Government priorities as outlined in the 1999-2000 Medium Term Agricultural Development Strategy (MTADS) identified the fisheries-sub sector as one of the most important sources of economic growth; however, it noted that the sector was subject to fisheries resource overexploitation exacerbated by inadequate public sector capacity for formulating and enforcing appropriate policies and plans to well manage the resources.

4.2.1 World Bank funded Fisheries Sub-sector Capacity Building Project

The World Bank funded Fisheries Sub-sector Capacity Building Project (FSCBP) was designed to establish the long-term sustainability of the fisheries resources and thereby maximize its contribution to the economy. The project sought to strengthen the capacity of the Department of Fisheries (DoF) for managing the sub-sector. It focused on formulation and implementation of policies and management plans; monitoring, control, surveillance and enforcement; and promotion of the development of inland fisheries and aquaculture.

The project also supported the establishment of a co-management system by funding the formation of Community-Based Fisheries Management Committees at the local level. The Community Based Fisheries Management Committee (CBFMCs) are committees formed in a fishing community based on existing traditional leadership authority and common government structures, legally empowered by local law and comprising all stakeholders, to oversee the management and development of the fishing industry. It is to ensure the active participation of the local people in decision making and implementation. When gazetted into law the CBFMCs are empowered to generate and sources for funds for their activities.

The total project cost (as appraised by the World Bank) was US$10.5m, and the World Bank/International Development Association (IDA) contribution was US$9.0m. The contributions was used to procure: goods, including vehicles and equipment (US$1.270m); works comprising mainly of civil works (US$2.000m); services made up mainly of consultancies (US$0.945m); training (US$1.760m); vessel rehabilitation (US$0.665m); operational expenses (US$1.880m); and some funds were unallocated (US$0.480m).

Annual plans and budgets were subjected to critical hearing and approval by the steering committee of the project which was comprised of representatives of the Fisheries Commission and the World Bank. The GOG contribution was US$1.5m, allocated as local counterpart funding, to provide budgetary support to the Department of Fisheries in agreed percentages of the IDA funding. This funding was allocated to finance naval patrols.[3]

The four main project components of the project and corresponding funding levels were:

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[3] The Directorate of Fisheries had signed a contract with the Ghana navy for targeted 60 ship day patrols a year or 300 ship days for the project period.

- Strengthening the department of fisheries (US$5.0m);
- Marine fisheries management (US$2.2m);
- Inland fisheries management (US$1.5m); and
- Monitoring, control and surveillance (US$1.8m).

The outputs resulting from the execution of these components included a strengthened DoF (through re-organization and staff training); stock assessments; the preparation and implementation of management plans for marine and lake fisheries; strengthened extension in aquaculture; and the establishment of MSC systems for marine and Inland Fisheries. In addition to these outputs, it was also expected that the policy, legal and regulatory framework in the sub-sector would have been reformed to improve management, enhance private sector investment and promote sustainable catches of fish.

Component 1: Strengthen the Department of Fisheries

With an investment of US$5.0m, the Department of Fisheries (DOF) was strengthened through its reorganization to emphasize fisheries resource management functions. Specific outcomes related to this investment are that:

- All the divisions (Marine Fisheries Research, Marine Fisheries Management, Inland Fisheries Management, Monitoring, Control and Surveillance and Administration and Operation) were created with clearly defined measurable roles, and are performing their corporate functions satisfactorily.
- DOF has developed the capacity to conduct stock assessment, prepare and implement fisheries management plans. The revised Fisheries Law has been passed by Ghana's parliament and a strategy to enforce the law is being implemented.
- Remarkable increases in the revenue from license fees have been recorded from 69.0 million Cedis in 1996 to 1,190 million Cedis by June 2002, following the revision of license fees during project implementation to reflect the type of catch.
- Fishers in coastal villages have reported that training given by the DOF in safety at sea (among a range of other topics) helped to save the lives of some members in the community during dangerous incidences at sea.

Component 2: Marine fisheries management

With an investment of US$2.2m, the project was able to:

- Mobilize 133 artisanal fishing communities along the coast to form Community-Based Fisheries Management Committees (CBFMCs) as participatory preventive enforcement mechanisms that will enable fishers to comply with the Fisheries Law at the community level.
- Enable the 133 CBFMCs to prepare their local constitutions and by-laws, which have been passed and adopted by their District Assemblies (DAs), thus establishing a legal basis for the CBFMCs, to facilitate the complete elimination of illegal methods of fishing like dynamite use in marine fisheries, through organized surveillance, inspection of fishing nets for compliance with approved mesh sizes, local tribunals, and imposition of fines.
- Conduct two canoe frame surveys, which revealed 16 percent increase in number from 8,610 canoes in 1997 to 9 ,981 canoes in 2001, indicating increased pressure on fishing resources in the face of declining fish stocks.

Component 3: Inland fisheries management

With an investment of US$1.5m, the project was able to:

- Conduct a canoe frame and gear (for the first time since 1975) between 1998 and 1999, for Volta Lake and thereby generate the necessary data and maps for managing the resources of the Volta Lake fisheries;
- Conduct a stock assessment of the Volta Lake consisting of biological studies and catch assessment; survey; and

- Prepare a Volta Lake Fisheries Management Plan which included proposals for six projects.

Component 4: Monitoring, control and surveillance

With an investment US$1.8m, the Project enabled the newly established MCSD to organize:

- A joint patrol programme with the Ghana Navy (completing 65 out of 300 programmed trips) and began to regularly enforce the fishing regulations in the marine sector and Volta Lake systems but these patrols did not prove sustainable as costs became increasingly unbearable; US$325 000 was spent on 65 out of the targeted 300 ship day patrols for the entire project period.
- The total amount of fines imposed on the owners of the arrested vessels amounted to US$68 540 which was only about 23 percent of what it cost to conduct the patrols; however, the purpose of removing the industrial vessels from shallow waters was achieved.
- An observer programme for compliance and scientific monitoring of commercial fishing vessels, including regular port inspection and periodic beach combing.
- As already indicated fisheries dedicated Naval patrols succeeded in removing Industrial trawlers from shallow waters. Year 2000 was a good year as biomass of the valuables demersal fish species was estimated to be relatively higher than catch as seen from the biomass and catch tables. This phenomenon reversed in 2006 when the patrols seized because of lack of funds.
- Enforcement in the Volta Lake areas proved difficult due to the limited number of staff and resources in the face of an extremely large and difficult geographical terrain that must be covered.

4.2.2 The FAO/NANSEN programme for research

US$380 000 was the operational cost of the FAO/NANSEN programme to conduct two marine fish stock assessment surveys in 1999 and 2000 during the Fisheries Project, and the cost was borne by the Norwegian Agency for Development Cooperation (NORAD). Since an outside agency conducted the survey on its own timetable, the timing was not the best for Ghana.[4]

As it is, one of the two surveys was conducted in the lean season and therefore did not help monitor fully the pelagic species biomass levels. The survey did provide, however, a very good indication of demersal stock abundance and indicated that 2000 was a good year for valuable demersals: there biomass of valuable demersals was estimated at 26 032 mt., a figure that exceeded the estimated landings of 16 679 mt demersal fish species.

In 1999 and 2000, MOFI relied on data gathered from eight costal stations for temperature and water salinity readings and assessments of demersal and pelagics fishery resources carried out with the help of donor agencies - including the two FAO-sponsored “Dr. Fridjof Nansen Survey Programmes” (NORAD, Institute of Marine Research, and FAO - and the Gulf of Guinea Large Marine Ecosystem Programme. In addition, a survey of fisheries resources on the continental shelf of Ghana was carried out over a two and half year period with the Japan International Cooperation Agency (JICA), the agency which implements the Government of Japan’s technical cooperation programmes.

4.2.3 International Commission for the Conservation of Atlantic Tuna (ICCAT)

The Marine Fisheries Research Division (MFRD) also collaborates on the Tuna Resources Study funded by the International Commission for the Conservation of Atlantic Tunas (ICCAT).

ICCAT conducts stock assessment survey to know the biomass and migratory patterns of tuna. It collaborates with commercial fishermen to study their catch for length/frequency distribution and maturity of various fish. The commission then allocates quotas for extraction. They, in turn, levy the tuna industry based on production and canning capacity.

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[4] Because of environmental conditions, there must be at least 2 surveys in a year: one for major upwelling season, and another for the minor upwelling seasons that are linked to Sardinella production.

4.2.4 Food and Agriculture Budgetary Support from the Canadian International Development Agency (CIDA) and Department for International Development of the UK (DFID)

The Food and Agricultural Budgetary Support (FABS) Project became effective in March, 2004, with total committed funds of CDN$85 million over five years (2004–2009). It was designed by the Canadian International Development Agency (CIDA) to provide budgetary support to the Government of Ghana to promote sustainable rural development in Ghana through agriculture. Its purpose was to support the implementation of the Food and Agricultural Sector Development Policy (FASDEP) through a sector wide mechanism.

DFID joined the budgetary support programme in 2006 with an amount of £4.4 million to be disbursed over a three year period. It has been mutually agreed between CIDA and DFID that they will jointly use the approaches and processes laid down under the FABS for disbursements and reporting.

Data provided in Table 11 shows progressive increases in the FABS allocation to the Ministry of Fisheries. Significantly, the FABS contribution experienced a great leap in 2005 from one to ten billion Cedis and then to twelve billion in 2006. This leap also coincided with the creation of the Ministry of Fisheries in 2005.

Table 11: Allocation of FABS to the Ministry

Year	FABS Allocation
2004	1 000 000 000.00
2005	10 000 000 000.00
2006	12 000 000 000.00
2007	--
Total	**23 000 000 000.00**

4.2.5 Sustainable Fisheries Livelihoods Programme (SFLP) Pilot Project 1: Improvement of policies and institutions for comanagement of the Volta Lake

The Project on Improvement of Policies and Institutions for Co-management of the Volta Lake (IPIC) is the first pilot project of the Sustainable Fisheries Livelihoods Programme (SFLP). The SFLP represents a partnership between the FAO, the Department for International Development (DFID) of the Government of Great Britain and Northern Ireland and 25 countries in West Africa. The SFLP sought to reduce poverty in the artisanal fishing communities of West Africa by bringing about improvements in the livelihoods of these communities.

Ghana implemented SFLP pilot project 1 on the Volta Lake with the theme, ‘Improvement of Policies and Institutions for Co-management in Inland Waters’. The other participating countries were Burkina Faso, Mali and Cote D’Ivoire.

The pilot project commenced in Ghana in June 2003 and ended in July 2006. It was implemented in three Volta Lake Districts of Ghana – in Asuogyaman, Kpando and Jasikan, with the project office located at Akosombo in the Asuogyaman District – over a three- year period.

The goal of the IPIC project was to reduce poverty and improve livelihoods through sustainable participatory management of water bodies and aquatic resources. The Project Purpose was to improve fisheries livelihoods by the establishment of co-management mechanisms and the integration of fishing communities into local development processes.

The total cost of the Pilot Project 1 was US$3 150 209, with Ghana receiving an amount of US$493 801comprising the following expenditure items: administration US$109 000; investment US$64 000; recurrent expenses US$46 280; project outputs US$199 647; and unallocated funds US$74 310. The project components translated into the following costed outputs as shown below in Table 12.

Table 12: Project output and budget estimates

OUTPUTS	BUDGET ESTIMATES US$
A participatory co-management plan and functional institutional	38 660

OUTPUTS	BUDGET ESTIMATES US$
framework for the Volta Lake in place.	
Policy and legislative framework for participatory co-management improved.	19 413
Social and economic benefits to fisheries communities improved both from the sector and from increased participation in wider local development processes.	39 310
Capacity of stakeholders at all levels to contribute to co-management and local development increased.	37 102
Sources of finance to sustain participatory co-management systems and community development programmes identified.	4 912
Information networks, communications and monitoring systems established to support resource management and the improvement and diversification of livelihoods.	55 250
The environment and the resources of water bodies protected and enhanced.	5 000
Total	**199 647**

Project Output and activities undertaken and impact

Output 1: A participatory co-management plan and functional institutional framework for the Volta Lake in place.

The project prepared the Volta Lake Fisheries Management Plan final document signed and subsequently submitted by the Minister of State for Fisheries to the Attorney General's (AG's) Department for gazetting.

Three awareness creation workshops were organized on the Volta Lake Fisheries Management Plan for all the stakeholders along the Volta Lake, and a national workshop was held in the capital city, Accra.

The impacts of the workshops were twofold. First, a framework for management of the fisheries in all the Regions adjoining the lake was made available for budgeting purposes and for drawing up annual workplans for all institutions interested in the Volta Lake (especially for the Directorate of Fisheries Department and the District Assemblies). Second, an advocacy group comprising various research institutions and NGOs was formed to lobby the government on fisheries issues.

The Project engaged the services of a Social Mobilisation Consultant to prepare a strategy document for formation of lake management entities for the Volta Lake. This document, together with the Volta Lake Fisheries Management Plan, provided the much needed guidelines for the composition, functions and responsibilities of the various fisheries management committees for the sustainable management of the lake's resources.

The Volta Lake Management Committee bylaws were passed by the assemblies. This made DLMC a sub-structure of the district assembly that could be budgeted for. The impact of doing so was to obtain funds for its activities so that it could be sustained long after the project. In the Kpando District the assembly agreed to make the Member of Parliament a member of the core group. The impact of legal recognition of the management entities is that they are now recognized as legal bodies acceptable to banks and other financial institutions

The impact of the operations of the lake management committees was felt in the communities in which they existed as the fisheries resources improved through reductions in the use of illegal fishing gear. Participatory monitoring reports showed tilapias caught from the lake were mature (refer to Annex 1). In addition, the activities of the committees helped to improve safety on the lake.

Output 2. Policy and legislative framework for participatory co-management improved.

A draft Inland Fisheries Policy document was prepared by the project and circulated at the national and international levels including the FAO Regional office for Africa and the Regional Coordinator in Burkina Faso. The impact of the inland fisheries policy document was that it was used for the preparation of the Volta

Lake Fisheries Management Plan and Development Plans for the districts in the operational areas of the project.

The project assisted the communities in the formulation, adoption and gazetting of lake management bylaws. To improve on the quality of the output and to unify draft community bylaws to produce district laws, a legal expert was identified and recruited for 2 months.

The legal expert produced 3 bylaws for each district, namely:

- bylaws for the Volta Lake Management Committee;
- bylaws for the Volta Lake Environmental Protection; and
- bylaws for the Volta Lake Fisheries Resources.

The impact of the formulation processes was that the Directorate of Fisheries agreed to adopt it for improvement of bylaws in the marine and the other inland water bodies.

Output 3. Social and economic benefits to fisheries communities improved both from the sector and from increased participation in wider local development processes.

The project had to deliver social benefits to the participating communities and supported alternative livelihoods programme in the communities. A list of 15 enterprises emerged from consultations at the community and institutional levels by a consultant engaged by the project. The enterprises were: kente weaving, snail farming; mushroom production; bee keeping; leather bag production; sheep and goats rearing; grass cutter production; piggery; rainfed okro farming; and fish farming.

There was over 100 percent increase in employment opportunities in the fishing communities in which the livelihoods diversification was introduced e.g. kente weaving, snail farming etc Again considerable reduction in fishing pressure on the lake was recorded since other fishermen were being drafted into other income generation activities

Output 4. Capacity of stakeholders at all levels to contribute to co-management and local development enhanced

Capacity building workshops were organized to:

- Strengthen the capacity of the lake management entities in areas of cross-sectoral approaches, lobbying, negotiations, advocacy and management planning and facilitation;
- Improve organizational skills of community, zonal and district lake management entities to facilitate co-management; and
- Strengthen capacity of lake management entities on negotiating and arbitration skills.

Output 5. Sources of finance to sustain participatory co-management systems and Community development programmes identified

To build structures for sustainability, the project assisted the District Lake Management Committees to prepare a list of sources of revenue for fisheries management. These sources included:

1. Annual fishermen registration/membership fee;
2. Annual registration fee for fish vendors;
3. Annual registration fee for net sellers;
4. Annual fishing canoe registration fee;
5. Annual registration fee for boat builders;
6. Annual registration fee for outboard motor mechanics;
7. Annual registration fee for salt sellers;
8. Annual registration fee for transport boats;
9. Annual registration fee for road transport vehicles in fish transportation;
10. Annual registration fee for push truck owners in transportation of fish;

11. Annual registration fee for premix sellers;
12. Fish landing fee in kind or a set value per boat landing fresh fish at a fishing site;
13. Fish landing fee (processed or fresh) at a marketing centre;
14. Landing fee for transport boats at a fish marketing centre;
15. Fish exportation fee (movement of fish outside a community or a market);
16. Fish movement fee for road transport vehicles conveying fish;
17. Proceeds from sale of fish, fishing gear and boats confiscated from illegal fishing;
18. Fees for renting/use of fisheries facilities (choker ovens and trays provided in community processing facilities); and
19. Fines as stated in bylaws of CBLMCs approved by the District Assembly.

An agreed-upon ratio to allocate revenues between the lake management committees (district and community) and the assemblies was:

- 50 percent to the District Assembly;
- 10 percent to the DLMC;
- 10 percent to the CBLMC; and
- 30 percent to the community.

The impact was that the revenue base of district assembly was expanded by 15 percent and that revenue would now be set aside for fisheries management. Bylaws were passed by the 3 assemblies to formally give legal backing to the revenue generation proposals. Again, the opportunity was given to all levels of the lake management entities to retain part of the revenue collected for local development to be decided by the fishing communities themselves. Negligible funds were hitherto directed to development programmes in the fishing communities.

The Asuogyaman District Assembly agreed to establish a Fisheries Development Fund to be capitalized by 2 percent of the Poverty Alleviation Fund. A resolution was passed to further increase the Fisheries Development Fund by allocating 2 percent of the District Assembly Common Fund. This comparatively is a huge amount due to the fisheries sector in the district.

Output 6. Information networks and communication and monitoring system established to support resource management and the improvement and diversification of livelihoods.

The Project conducted a series of workshops and established participatory monitoring and evaluation systems in the Asuogyaman, Kpandu and Jasikan districts. The result of the workshops was the identification of indicators of change in livelihoods due to project implementation.

During the end of the second year, the project managed to install the monitoring and evaluation systems developed for the three districts by training all the stakeholders selected and supplying them with some of the basic logistics.

Output 7. The Environment and the resources of water bodies protected and enhanced.

To enhance the environment along the water bodies, the project – in collaboration with Forestry Services Department (FSD) – trained and established nurseries and woodlots in fifteen communities of the participating districts. A total of 53 acres was covered by the beneficiary communities. The project procured and distributed nursery materials including seeds (acasia and teak) to all the fifteen communities participating in the programme. Ownership of the land for the tree planting programme was controversial and impeded the rate of adoption, particularly by settler communities.

The impact of tree planting programme was that it whipped up community participation initiatives in the fishing communities led by the CBLMCs. Employment opportunities increased through establishment of woodlots for sale as fuel wood.

The project promoted energy efficient ovens which are known to reduce the amount of fuel wood used and which eventually will reduce the rate of environment degradation by 60 percent. A total of 250 fish processors benefited from the programme to provide communal fish processing facilities, mud stoves and chorkor ovens for the individual fish processors.

5. FISHERIES MANAGEMENT EXPENDITURES

In this section of the paper, changes in the quantum and composition of fisheries expenditures are explained.

5.1 Factors influencing fisheries management expenditure

The factors determining expenditure levels to management dedicated to marine and Volta Lake fisheries can be classified as levels of (i) administrative factors, (ii) policy related factors, and (iii) external factors.

Administrative factors that affect fisheries management expenditure are the numbers of available personnel, the recruitment of personnel/consultants, the availability of vessel and equipment, and the running and maintenance of vessels and equipment.

Policy-related factors include priorities of Government and Ministry; the contribution of outputs to growth and development; the contribution of fisheries to poverty alleviation and wealth creation; the state of fisheries resources; the socioeconomic impact on the economy and social life of community; and the need for urgent responses to emerging issues.

External factors include support and commitments to international protocols and availability of funds from donor partner sources such as the World Bank, ICCAT and the FAO. Table 13 shows changes in fisheries expenditures with respect to GOG's consolidated funds.

Table 13: Fisheries expenditures with respect to GOG's Consolidated Funds

Year	GOG expenditure for management	Value of fisheries	Efficiency of GOG funding
2000	1 880 804 678	1 480 591 236	0.79
2001	961 246 203	1 576 073 835	1.64
2002	816 178 411	2 135 275 456	2.62
2003	1 815 558 283	4 661 520 828	2.57
2004	1 843 586 814	5 049 130 065	2.74
2005	5 882 000 000	5 286 301 829	0.90
2006	8 965 000 000	5 933 709 043	0.66
2007	6 196 000 000		
Average			1.70

The data suggests lower levels of expenditure from 2000 to 2004 and progressive increases since 2005. Policy-related factors largely account for changes in the quantum of expenditure on fisheries management after 2004. In particular, GOG's decision to give more prominence to the fisheries sector by carving it out of the Ministry of Agriculture and constituting it as a separate Ministry has resulted in better articulation of fishery policies and issues, with resultant increases in budgetary allocation and expenditures. Data in Table 10 shows that, over the years, allocations to the fishery sector have never gone beyond 0.05 percent of the national budget. In 2005, the year of establishment of the Fisheries Ministry, this percentage rose dramatically to 0.1 percent and has ever since, it remained at 0.8 percent, affirming increased resource inflow to and expenditures by the sector resulting from the creation of the Ministry.

Creation of the Ministry has also resulted increased expenditures attributable to administrative factors. More staff has been employed to service the Ministry and the Directorate of Fisheries. During this short period of the creation of the Ministry, relative huge expenditures have been made in the procurement of a fishing vessel at a cost of three million pounds (£3.0m) being paid for at one million pounds a year.

Not only has the creation of the Ministry resulted in more aggressive resource mobilization of resources from GOG sources, it has also resulted in more resource inflows from external Donor/Partner sources, contributing to significant leaps in national fishery management expenditure levels. Data in Table 14 illustrate the trend of rising resource inflows from GOG, FABS and, therefore, the total volume of funds available to be expended.

Table 14 Total GOG and donors expenditure, 2004-2007

Year	GOG Allocation	FABS Allocation	IPIC Project	Total
2004	1 843 586 814	1 000 000 000	1 481 402 999	4 324 989.813
2005	5 882 000 000	10 000 000 000	1 481 402 999	17 363 402 999
2006	8 965 000 000	12 000 000 000	1 481 402 999	22 446 402 999
2007	6 196 000 000			6 196 000 000
Total	22 886 586 814	23 000 000 000	4 444 208 997	50 330 795 811

5.2 Components of fisheries management expenditures

Fisheries management expenditures are conveniently separated into fisheries operations, research and enforcement. Table 15 illustrates the 3 main fisheries expenditure categories from the consolidated fund.

Table 15: Fisheries expenditure categories

Year	Research	%	Operational management	%	Enforcement	%	Total
2005	512 022 461	55	184 493 927	20	240 462 183	25	936 978 571
2006	440 195 418	30	163 151 418	11	898 549 649	59	1 501 896 485
2007	587 840 096	51	341 318 821	30	221 537 004	19	1 150 695 921
Average		45		20		34	

The allocations to research, policy development/operational management and enforcement are 45 percent, 20 percent and 25 percent, respectively. This means that more of the available funds are allocated to research followed by enforcement with the least to the policy development and operational management. This makes data and information gathering for fisheries management planning and decision making as the most important key activity followed by enforcement and then policy development and operational management.

In terms of composition, the available data shows that the highest percentages of fisheries expenditures have been in the in the area of fisheries research. There is a wealth of data from fisheries research for planning and, as indicated by the declining trends in Catch per Unit Effort (CPUE), there is a need for more investment in operational management and in the enforcement areas.

5.3 IMPACT OF FISHERIES MANAGEMENT EXPENDITURE

In the experience of the IPIC project, an amount of US$493,801 was expended over a three year period, as per the various components of the project presented in Table 16. In addition to the project funds the management committees managed to expand the revenue base of district assembly by 15 percent, and revenue will now be set aside for fisheries management.

Again, the opportunity was given to all levels of the lake management entities to retain part of the revenue collected for local development to be decided by the fishing communities themselves. This low cost fisheries management scheme must be replicated in other lake districts and the marine environment.

Table 16 IPIC Project Expenditure on Outputs

OUTPUTS	Expenditure (US$)	Expenditure (¢)
A participatory co-management plan and functional institutional framework for the Volta Lake in place	38 660	355 672 000
Policy and legislative framework for participatory co-management improved	19 413	178 599 600
Social and economic benefits to fisheries communities improved both from the sector and from increased participation in wider local development processes	39 310	361 652 000
Capacity of stakeholders at all levels to contribute to co-management and local development increased	37 102	341 338 400
Sources of finance to sustain participatory co-management systems and	4 912	45 190 400

OUTPUTS	Expenditure (US$)	Expenditure (¢)
community development programmes identified		
Information networks communications and monitoring systems established to support resource management and the improvement and diversification of livelihoods	55 250	508 300 000
The environment and the resources of water bodies protected and enhanced	5 000	46 000 000
Administration	109 000	1 002 800 000
Investment	64 000	588 800 000
Recurrent	46 280	425 776 000
Unallocated	74 310	683 652 000
Total	4931 801	4 537 780 400

5.4 Tracking system

An analysis of financial information and presentation of financial indicators shows that a three tier tracking system approach is used to track expenditures in the sector:

- The monitoring and evaluation unit monitors expenditures, according to the objectives and types of activities as service costs, can be seen to contribute to development and management.
- The Internal Audit Unit of the Accountant General's Department carries out financial vetting of expenditure proposals before funds are released.
- The External Audit Unit of the Audit Service also ensures that expenditures are made according to laid down financial regulations and intended purposes.

6. SUSTAINABILITY, COST RECOVERY AND LOW COST APPROACHES TO FISHERIES MANAGEMENT

Fisheries management objectives are not being met in Ghana due inadequacy of funds. The MOFI usually receives about 50 percent of budget estimates. In addition less than 75 percent of the allocated resources are released to implement its activities. This situation compels the Directorate to re-prioritize its activities, and in most cases less importance is attached to fisheries management.

In the case of enforcement, DOF engaged the services of the Ghana Navy for Naval Patrol under the Fisheries Sub-Sector Capacity Building Project. It was funded by the GOG counterpart fund as the World Bank does not fund military operations. It was agreed under the Contract to conduct three hundred ship day patrols. However, it cost US$5 000 per day for the naval patrol. This was found to be too prohibitive to be contained within the scarce resources from the GOG. From 1996 to 2002, the Ghana Navy was able to conduct 65 ship day patrols. The patrols were found to not be cost effective though the industrial vessels were kept off the 30 meter depth zone for a limited period. The naval patrols were to be complemented with aerial patrols by the Ghana Air Force, but these did not take place because the cost was too prohibitive. Currently, there is no agreement over naval patrols.

US$185 125 was spent on a frame survey of the Volta Lake. Since this was the first within 25 years, it involved capital, training and operational costs. During the project period, US$18 300 was spent on 2 marine canoe frame surveys. This helped update the data on artisanal canoe fisheries in terms of canoe numbers, fishing villages and landing sites, total number of fishermen, the number and types of gear, etc. There is the need for participatory data collection systems to build on the gains of the formal data systems to capture impacts of projects etc.

6.1 SUGGESTIONS FOR LOW-COST APPROACHES TO FISHERIES MANAGEMENT

The Ghana navy is mandated to patrol Ghana's territorial waters against external aggression and poaching by foreign vessels and to clear shallow waters of depth less than 30 metres of industrial vessels. It is suggested that the Navy includes fisheries monitoring in their normal patrols at sea.

Port inspections/quayside inspections are carried out on vessels at port before they sail to sea - a management activity that requires little funds. However, it is subject to abuse as in the past some vessel operators did manipulate the system and carry out their illegal activities with impunity. Nonetheless, if strengthened, it could be a low cost approach to enforcement.

In collaboration with the District Assemblies and the management entities, the SFLP/Pilot Project in Ghana developed revenue generation system. This tried and tested revenue system must be adopted by the communities, as they will be able to generate their revenue for operations and also initiate community development projects to sustain the running of the office of the communities.

Strengthening of the Management entities (Community based Lake Management Committee / zonal based Lake Management Committee) and the District Lake Management that was established during the IPIC Project with backing from the Local Authority will ensure development of institutions for low cost management.

The issue of poverty and vulnerability to poverty has compelled fishermen to use illegal fishing methods with utter disregard to fishing regulations and bylaws. The best option available to mitigate the social cost of enforcement of the fisheries bylaws and regulations is the provision of alternative livelihoods.

7. CONCLUSION AND RECOMMENDATIONS

This part of the report summarizes the key issues and presents recommendations for cost effective fisheries management.

7.1 CONCLUSION

Experiences with various sources of finance revealed that the government is the main and permanent source of funding fisheries management. Funds obtained for the regulatory functions of the Ministry of Fisheries are expected to be paid into the Fisheries Development Fund as required under the Fisheries Act 625. The Act also contains provisions for the formulation of policies to generate funds and to determine the allocations to be made from the Fund by the Fisheries Commission; however, this cannot yet occur because the FC is yet to be reconstituted.

Up to 2005, the fishery sector management was under the Ministry of Agriculture. Visibility and effective articulation of fishery management policies and issues and resource mobilization were therefore highly constrained. Creation of the Ministry of Fisheries has resulted in more aggressive resource allocation and mobilization resulting in higher levels of fisheries management expenditures.

There is a very impressive system of collection of licensing fees from the industrial and semi industrial fleet which currently generates an annual total of about US$900 000. It is important to set up guidelines for the utilization of funds according to the priorities for fisheries management. With constant pressures to increase internally generated funds, there is also the need for studies to evaluate the impact of the fees on the resources.

The management regime of licensing and restricting access does not cover the artisanal fisheries sector. The open access nature of the artisanal sub-sector has resulted in increases in both the fleet size and the number of fishermen. This, coupled with the declining resources, has resulted in low incomes and vulnerability.

Funds from development partners, in terms of both the quantum and the targeting of programmes, have been important to enable the Ministry of Fisheries carry out some fisheries management functions such scientific data gathering, preparation of management plans and establishment of fisheries MCS unit. Data gathered from these studies were used to develop a Volta Lake Fisheries Management Plan and a Marine Fisheries Management plan. The plans were reviewed by the then FC, but they are yet to be implemented because of a lack of funds. There is the need to consolidate the gains made by investing in implementing the management plans and managing the results of the process.

7.2 RECOMMENDATIONS

The following recommendations are suggested contribute to the attainment of effective fisheries management with low cost approaches in Ghana:

- The Fisheries Commission as provided for in Act 625 should be reconstituted and operationalized.
- A participatory management regime - in terms of registration and licensing of canoes - has to be implemented.
- Co-management system must be strengthened. The experiences of the IPIC co-management project have shown how collaboration can be built between users of the resources, stakeholders and fisheries managers to generate funds at the local level to strengthen the co-management system.

- In light of the declining natural resource base and the increasing population of fisheries stakeholders, a key strategy to ensuring that the management of the fisheries resources is successful is the generation of alternative, appropriate and sustainable livelihoods opportunities that can attract people and investment out of the fishery and that can encourage those who remain in the fishery to diversify their existing livelihoods strategies.
- The Directorate of Fisheries must procure a small multi purpose patrol/research vessel to combine research with patrols (especially within the 30 meter depth zone) to remove the industrial vessel from the shallow waters which are the habitat and spawning grounds of most fish.

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ANNEX 1: MONTHLY MODAL SIZE OF *OREOCHROMIS NILOTICUS* CAUGHT JULY 2004-SEPT 2005

Mid-length (cm)	Modal length (cm) caught																		
	2004							2005											
	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
10				X			X												
11		X																	
12																			
13																			
14								X	X										
15															X				
16						X													
17																			
18					X														
19																			
20											X								
21			X																
22														X					
23													X						
24												X							
25																			
26										X									

Length at maturity

ANNEX 2: CEDI EQUIVALENT TO US$

CEDI EQUIVALENT TO US$ BY 31ST DECEMBER	
1997	2 250
1998	2 330
1999	3 500
2000	5 229
2001	7 230
2002	8 500
2003	8 750
2004	9 000
2005	9 000
2006	9 200
2007	9 300

FINANCING FISHERIES MANAGEMENT: THE INDIAN SITUATION

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Yadava, Y.S. 2008. Financing fisheries management: The Indian situation. In R. Metzner (comp.). Report of the Expert Consultation on Low-cost Fisheries Management Strategies and Cost Recovery, Georgetown, Guyana, 4–7 September 2007. *FAO Fisheries and Aquaculture Report*. No. 853. Rome, FAO. pp. 237–274.

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1. COUNTRY PROFILE

India is one of the oldest civilizations in the world with a kaleidoscopic variety and rich cultural heritage. It is positioned between latitudes 8° 4' and 37° 6' north and longitudes 68° 7' and 97° 25' east with a geographical area of 3 87 263 sq km (about 2.4 percent of the earth's surface area). The country is bounded by the Himalayas in the north, the Indian Ocean in the south, the Bay of Bengal on the east and the Arabian Sea on the west. India is also the second most populous country, with a population of about 1 28 million (about 17 percent of the global population) as per the 2001 National Population Census.

After independence in August 1947, the country adopted a socialistic style of development through centralized planning. The National Five-Year Plans were formulated and implemented to harmonize the use of resources for parallel development of capital-intensive heavy industries, with labour intensive small-scale industries and the rural and agricultural sectors.

Within three decades of independence, the country recorded achievements in technology and also attained self-sufficiency in food production through the 'green revolution'. However, the lukewarm growth of the economy during this period and the worsening balance of payment situation led the government to undertake a series of reforms. Beginning in mid-eighties, these reforms were mainly directed to minimize the state interference in business and liberalize the economy. These efforts culminated in the New Economic Policy of 1991 and portray a clear shift from pro-planning to pro-market growth model based on the principles of liberalization, privatization and globalization of the economy.

India now stands as the third largest economy in the world in terms of purchasing power parity[2] (PPP) and the the second fastest growing major economy in the world, with a GDP growth rate of 9.4 percent for the fiscal year 2006–2007[3]. However, in spite of marked developments in the industrial and tertiary sectors, agriculture sector continues to remain as the major determinant of the health of the economy. It contributes about 20 percent of the Gross Domestic Product (GDP) and employs about 60 percent of the labour force in the country. Industries contribute about 26 percent of the GDP and employ about 12 percent of the labour force and the tertiary sector contributes the rest (about 54 percent) and employs about 28 percent of the labour force.

1.1 Characteristics of the fishery

1.1.1 Scope of fisheries management in India

Fisheries management, in the present context, implies a governmental system of management rules based on defined objectives and a mix of management means to implement the rules, which is put in place by a system of monitoring, control and surveillance (MCS). Modern fisheries management is most often based on biological arguments where the idea is to protect the biological resources in order to make a sustainable exploitation possible. As per the 'ecosystem approach', fisheries management is defined as management actions aimed at conserving the structure and functions of marine ecosystems, in addition to conserving the fishery resources.

In the Indian perspective, the scope of fisheries management can be traced through the Five-Year Plans. On perusal of the Plans, it is seen that until the Seventh Five-Year Plan (1985–1990), the Government was mainly concerned with increasing fish production and promoting capitalization of the fishing fleet. Fisheries management per se was not elucidated in the earlier Plans. It was only during the Eighth Five-Year Plan (1992–1997) that fisheries management figured in the scope of Plan budget, which was then carried on to the subsequent Plans also. The following excerpts from the Comprehensive Marine Fishing Policy, 2004 of the Government of India provide some glimpse into fisheries management, as conceived by the Government of India:

> *"The marine fishing policy announced by the Government of India in the past focussed only on the developmental needs of the deep-sea sector, leaving aside similar issues pertaining to the coastal sector to the respective marine states/ Union Territories (UTs). Even though substantial assistance*

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[2] World Development Indicator database, World Bank (Revised on September 2007)

[3] Economy of India, http://en.wikipedia.org/w/index.php?title=Economy_of_India&oldid=176996061 (last visited Dec. 11, 2007).

was channelled through the Central and Centrally Sponsored Schemes to the States/UTs for the development of coastal fisheries, non-existence of an integrated policy for this sector was found to hamper fulfilment of the national objectives."

1.1.2 Commercial fisheries

The fisheries sector occupies a very important place in the socio-economic development of India. Soon after independence in 1947, the Government started focussing on the fisheries sector for two reasons: (1) to promote fisheries production in order to ensure food safety (subsequently foreign exchange earning were also added); and (2) capacity building in fisheries through subsidisation of various assets.

As a result, starting from a purely traditional activity in the fifties, both aquaculture and fisheries have now transformed to commercial enterprises. The sector has been recognized as a powerful income and employment generator as it stimulates the growth of a number of subsidiary industries and is a source of cheap and nutritious food.

The fisheries sector contributed Indian Rupees (INR) 347 580 million[4] to the GDP (at current prices) during 2005–2006, which is 1.07 per cent of the total GDP and 5.84 percent of the GDP from agriculture, forestry and fishing (Table 1 and Figure 1). During 1970 to 2006, the share of the sector in total GDP increased from 0.62 percent to 1.07 percent, recording a cumulative annual growth rate (CAGR) of 1.86 percent. The fisheries sector has also been one of the major contributors of foreign exchange earnings through export of marine products.

Table 1: Contribution of fisheries sector to the GDP in India

Year	Total GDP (million INR)	GDP from agriculture, forestry & fishing	GDP from fisheries	GDP from fisheries % of	
				Total GDP	GDP agriculture & allied Sectors
1970-71	397 080	168 210	2 450	0.62	1.46
1971-72	422 480	171 050	2 630	0.62	1.54
1972-73	464 730	187 720	3 050	0.66	1.62
1973-74	569 540	248 360	3 930	0.69	1.58
1974-75	670 390	270 570	4 540	0.68	1.68
1975-76	712 010	266 510	5 670	0.80	2.13
1976-77	765 360	271 050	6 010	0.79	2.22
1977-78	873 510	322 380	6 180	0.71	1.92
1978-79	938 800	328 150	9 380	0.79	2.25
1979-80	1 024 420	335 860	7 680	0.75	2.29
1980-81	1 224 270	422 660	9 210	0.75	2.17
1981-82	1 432 160	477 360	10 080	0.70	2.11
1982-83	1 593 950	505 270	11 740	0.74	1.02
1983-84	1 867 230	613 180	14 480	0.78	2.36
1984-85	2 085 330	651 810	17 160	0.82	2.63
1985-86	2 337 990	699 640	19 740	0.84	2.82
1986-87	2 600 300	744 050	22 500	0.87	3.02
1987-88	2 948 510	835 150	26 860	0.91	3.22
1988-89	3 527 030	1 041 030	31 420	0.89	3.02
1989-90	4 086 610	1 154 470	37 810	0.93	3.28
1990-91	4 756 040	1 351 620	47 560	0.96	3.37
1991-92	5 515 520	1 623 170	53 000	0.96	3.27
1992-93	6 279 130	1 845 360	66 490	1.06	3.60
1993-94	7813450	2419670	86790	1.11	3.59
1994-95	9170580	2787730	106020	1.16	3.80
1995-96	10 732 710	3 031 020	118 660	1.11	3.91
1996-97	12 435 470	3 626 060	140 830	1.13	3.88
1997-98	13 901 480	3 870 080	172 690	1.24	4.46
1998-99	15 981 270	4 424 940	181 560	1.14	4.10

---

[4] US$1 = 39 INR (approximately.)

Year	Total GDP (million INR)	GDP from agriculture, forestry & fishing	GDP from fisheries	GDP from fisheries % of	
				Total GDP	GDP agriculture & allied Sectors
1999-00	17 618 380	4 619 640	200 170	1.14	4.33
2000-01	19 029 980	4 684 800	225 350	1.18	4.81
2001-02	20 814 740	5 105 680	248 430	1.19	4.87
2002-03	22 548 880	5 078 630	270 930	1.20	5.33
2003-04	25 197 850	5 752 830	270 260	1.07	4.70
2004-05	28 559 330	5 366 290	287 750	1.01	5.36
2005-06	32 509 320	5 950 580	347 580	1.07	5.84

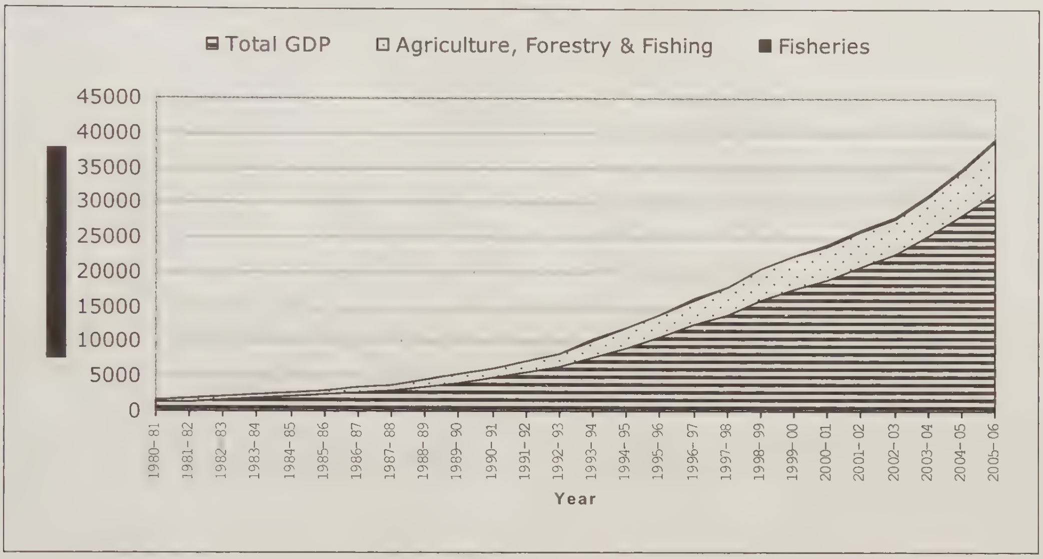

Figure 1: Contribution of fisheries sector to the GDP in India (1980–2006)

1.1.3 Recreational fisheries

In India, recreational fishing was initiated during the colonial rule as a pastime activity for the British. As a result, trout species (brown and rainbow) were introduced in the upland waters of the country, mainly in the Himalayan states. Presently, state governments such as Jammu and Kashmir, Uttar Pradesh, Sikkim and Arunachal Pradesh are promoting sport fishing to boost tourism.

Besides trout species, indigenous species such as Tor putitora and T. tor are also excellent sport species and their promotion for tourism is being carried out in the states of Haryana, Maharashtra, Assam and Karnataka. In the northern states of Jammu and Kashmir and Himachal Pradesh, both brown and rainbow trout are available in plenty. In the northeastern states such as Assam and Arunachal Pradesh, the rivers Brahmaputra, Jia Bhoroli, Kapili, Manas and Bhalukpung, Yingkiong, Bodak and Siom have the potential to develop recreational fishing. The river Cauveri in Karnataka is another popular sport fishing river, mainly for T. khudree, a species native to the southern peninsula.

1.1.4 The fishers in India

Fishing is a traditional economic activity in India practiced for generations by the fisher communities. The fishers can be broadly classified as (1) inland fishers, (2) marine fishers and (3) fish farmers. Among the three, commercial-scale fish farming is a recent development and is also spread outside the domain of traditional fishers communities. As per the Livestock Census, 2003, 14.49 million people were engaged in various fisheries related activities in India. About 75 percent of the fishers are engaged in various inland fisheries activities and about 25 percent in marine fisheries activities. At the national level, about 6.44 percent of fishers are full-time and about 7.40 percent engage in part-time fishing.

As per the National Marine Fisheries Census (NMFC), 2005, the marine fisheries sector provides employment to about 0.9 million in active fishing and about 0.7 million fishers in various other fishing operations (Table 2 & Figure 2). The number of people involved in marine fisheries related activities include nearly 0.2 million in fish marketing, 0.1 million in repairs of fisheries requisites, around 0.2 million in fish processing and 0.1 million in other ancillary activities. In all, an estimated 3.51 million people depend on marine fisheries for their livelihoods in India.

Table 2: National Marine Fisheries Census, 2005

State and Union territories	Active fishers	Number of fishers involved in fishing allied activities							Total fisher population
		Marketing	Making/ repair of net	Curing/ processing	Peeling	labour	Others	Total	
West Bengal	70 750	5 237	15 326	4 705	478	26 151	5 844	57 741	269 565
Orissa	121 282	31 691	40 252	27 849	3 167	37 781	11794	152 534	450 391
Andhra Pradesh	138 614	34 337	23 926	28 319	2 996	55 372	7 942	152 892	509 991
Tamilnadu	206 908	36 126	19 051	6 250	2 107	25 657	15 318	104 509	790 408
Pondicherry	10 341	6 393	630	364	5	714	1 989	10 095	43 028
Kerala	140 222	17 976	9 560	3 881	8 057	17 242	14 358	71 074	602 234
Karnataka	37 632	14 327	7 876	3 342	581	14 043	5 530	45 699	170 914
Goa	2 515	1 688	479	0	0	515	700	3 382	10 668
Maharashtra	72 074	43 822	9 086	9 209	1 439	11 565	6 659	81 780	319 397
Gujarat	83 322	14 885	13 452	3 212	4 310	31 366	7 857	75 082	323 215
Daman & Diu	5 868	880	80	11	3	256	373	1 603	29 305
TOTAL	889 528	207 362	139 718	87 142	23 143	220 662	78 364	756 391	351 9116

Compared with the previous NMFC undertaken in 1980, it is seen that marine fisher population has nearly doubled from 1.87 million in 1980 to 3.51 million in 2005. Among the maritime states, West Bengal has the highest concentration of fishers per kilometre of coastline (1,706) followed by Kerala (1,012) and Orissa (938).

Among those engaged in active marine fishing, the majority (81 percent) are in full-time fishing, 13 percent on part-time basis and the rest in occasional fishing (Figure 3). Fishing as a full time profession is relatively popular in the west coast states/UTs (Gujarat, Goa, Daman & Diu, Maharashtra, Karnataka, Lakshadweep and Kerala) where 84 percent of active fishers are engaged in full-time fishing as compared to the east coast (West Bengal, Orissa, Andhra Pradesh, Puducherry, Andaman and Nicobar Islands and Tamil Nadu), where 79 percent fishers engage in full-time fishing. This is also supported by the fact that fishing operations are more capital-intensive in the west coast states than in the east coast states.

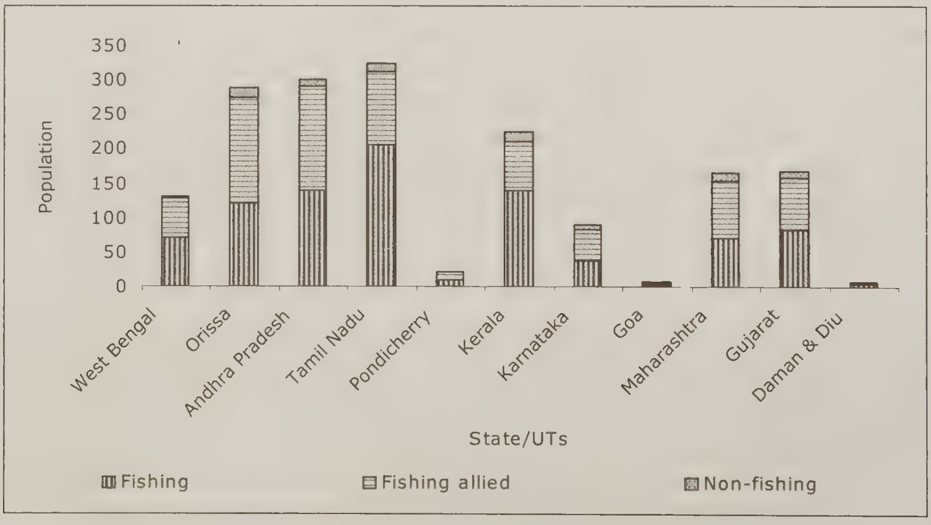

Figure 2: State and activity-wise marine fisher population

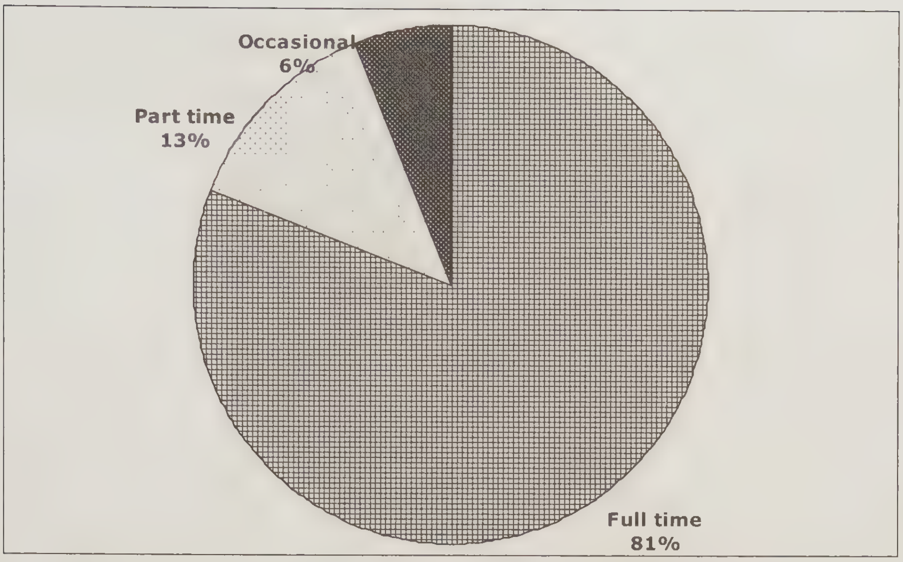

Figure 3: Engagement profile of active marine fishers in India

1.1.5 Trends in fish production and catch composition

Fish production in the country has been showing an increasing trend and reached a record level of 6.57 million tonnes in 2005–06. The marine fisheries sector contributed 2.82 million tonnes and the inland sector (including aquaculture) contributed 3.75 million tonnes in 2005–06 (Table 3). The progress in the inland fisheries sector during the 1990s has been commendable (6.55 percent per annum), whereas the growth in marine fish production during the same period has been slow (2.19 percent per annum).

Table 3: Trends in fish production (1950-2006)[5]

Year	Fish production ('000 tonnes)			Average annual growth rate (percent)		
	Marine	Inland	Total	Marine	Inland	Total
1950-51	534	218	752	--	--	--
1955-56	596	243	839	2.32	2.29	2.31
1960-61	880	280	1 160	9.53	3.05	7.65
1965-66	824	507	1 331	-1.27	16.21	2.95
1970-71	1 086	670	1 756	6.36	6.43	6.39
1973-74	1 210	748	1 958	3.81	3.88	3.83
1978-79	1 490	816	2 306	4.63	1.82	3.53
1979-80	1 492	848	2 340	0.13	3.92	1.47
1980-81	1 555	887	2 442	4.22	4.6	4.36
1981-82	1 445	999	2 444	-7.07	12.63	0.08
1982-83	1 427	940	2 367	-1.25	-5.91	-3.15
1983-84	1 519	987	2 506	6.45	5	5.87
1984-85	1 698	1 103	2 801	11.78	11.75	11.77
1985-86	1 716	1 160	2 876	1.06	5.17	2.68
1986-87	1 713	1 229	2 942	-0.17	5.95	2.29
1987-88	1 658	1 301	2 959	-3.21	5.86	0.58
1988-89	1 817	1 335	3 152	9.59	2.61	6.52
1989-90	2 275	1 402	3 677	25.21	5.02	16.66
1990-91	2 300	1 536	3 836	1.1	9.56	4.32
1991-92	2 447	1 710	4 157	6.39	11.33	8.37

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[5] Note: The growth rates presented for the period prior to 1979 are the average annual compound growth rates.

Year	Fish production ('000 tonnes)			Average annual growth rate (percent)		
	Marine	Inland	Total	Marine	Inland	Total
1992-93	2 576	1 789	4 365	5.27	4.62	5
1993-94	2 649	1 995	4 644	2.83	11.51	6.39
1994-95	2 692	2 097	4 789	1.62	5.11	3.12
1995-96	2 707	2 242	4 949	0.56	6.91	3.34
1996-97	2 967	2 381	5 348	9.6	6.2	8.06
1997-98	2 950	2 438	5 388	-0.57	2.39	0.75
1998-99	2 696	2 602	5 298	-8.61	6.73	-1.67
1999-00	2 852	2 823	5 675	5.79	8.49	7.12
2000-01	2 811	2 845	5 656	-1.44	0.78	-0.33
2001-02	2 830	3 126	5 956	0.68	9.88	5.3
2002-03	2 990	3 210	6 200	5.65	2.69	4.1
2003-04	2 941	3 458	6 399	-1.64	7.73	3.21
2004-05	2 779	3 526	6 305	-5.51	1.97	-1.47
2005-06	2 816	3 756	6 572	1.33	6.52	4.23

Source: Handbook of Fisheries Statistics 2006

The inland fisheries in the country comprises about 800 varieties of species, of which five major groups: Indian major carps, minor carps, exotic carps, murrels and catfishes are commercially more important (Table 4 and Figure 4). The Indian major carps (*Catla catla, Labio rohita, Cirrhinus mrigala.*) contribute about 58 percent of the total inland fish production followed by exotic carps such as silver (*Hypopthalmichthys molitrix*) and grass carps (*Ctenopharyngodon idella*).

Table 4: Catch composition of inland fisheries (production in tonnes)

Species/Year	2000	2001	2002	2003	2004	2005*
Major carps	1609 630	1781 238	1992 840	2022 721	2314 691	2357 470
Minor carps	133 839	155 773	178 362	188 781	293 228	128 017
Exotic carps	264 943	349 412	283 473	292 244	324 181	401 844
Murrels	139 409	122851	66392	73 011	73 011	58 368
Freshwater catfishes	116 239	78 367	101 488	106 282	106 282	94 909
Other freshwater fishes	300 710	401 018	270 115	279 225	279 225	135 666
Miscellaneous	263 336	195 588	273 256	258 143	258 143	581 031

* Provisional

On the other hand, the marine waters of India harbour around 1 707 species of fish, of which over hundred species are commercially harvested. Time-series catch composition of marine fishery shows considerable variation through the period 1950–2005 (Table 5 and Figure 5).

These changes are: (1) increase in the number of species harvested/ caught, (2) changes in catch composition and (3) a decline in population of some species. Broadly speaking, during the 1950s and 1960s, Indian oil sardines, natantian decapods, mackerels and Bombay duck constituted the majority (more than 1/3rd) of the landings, but since 1970s, share of Bombay duck in catch composition has declined steadily. The share of other dominant species such as clupeids and hair tails also declined considerably during the period 1950-2005. On the other hand a phenomenal rise in landing of prawns, shrimps and other marine crustaceans took place during the same period.

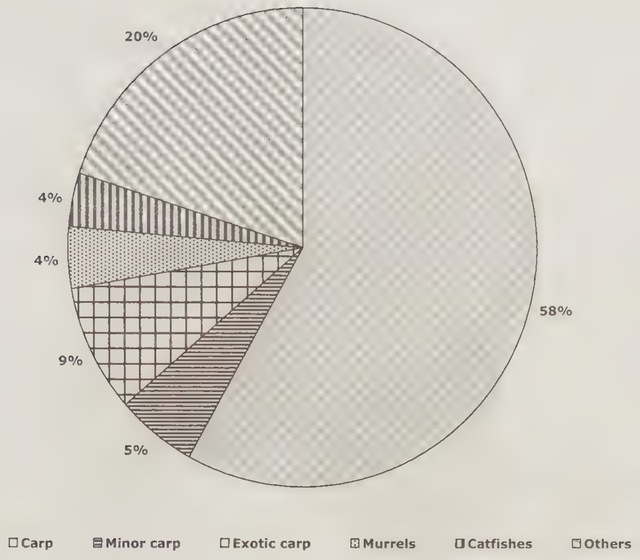

Figure 4: Catch composition of inland fisheries (2003)

Table 5: Composition of marine catch

Species	2000	2001	2002	2003	2004	2005
Miscellaneous aquatic animals	95	0	0	0	0	0
Others	0	0	8,750	8 750	0	0
Demersal species	951 042	903 119	917 935	860 109	904 988	928 136
Pelagic species	760 534	752 014	722 450	736 835	738 135	732 985
Marine fish	559 676	708 296	845 775	881 386	735 770	705 363
Crustaceans	382 372	378 052	436 028	451 705	411 068	412 755
Cephalopods	96 408	53 271	87 344	89 535	69 292	80 240
Molluscs (excluding cephalopods)	1 796	2 597	1 240	2 358	8 844	7 511

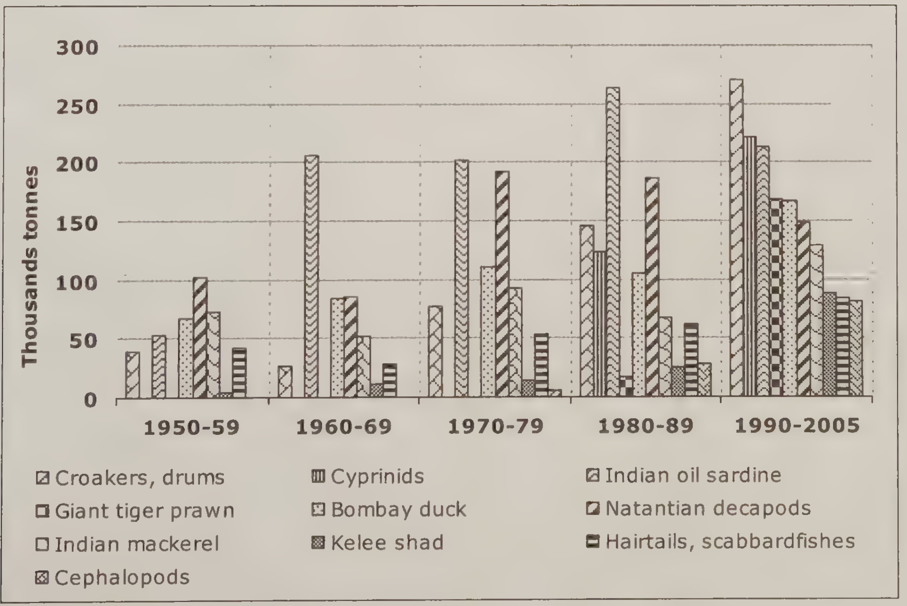

Figure 5: Changes in composition of marine fish landings in India

Group-wise (FAOSTAT), demersal fishes constitute about 16 percent of the total landings, pelagic species constitute about 13 percent and marine species (finfishes, etc) constitute about 25 percent of landings. The other marine varieties (crustaceans, cephalopods and molluscs) constitute about 17 percent of the landings (Figure 6).

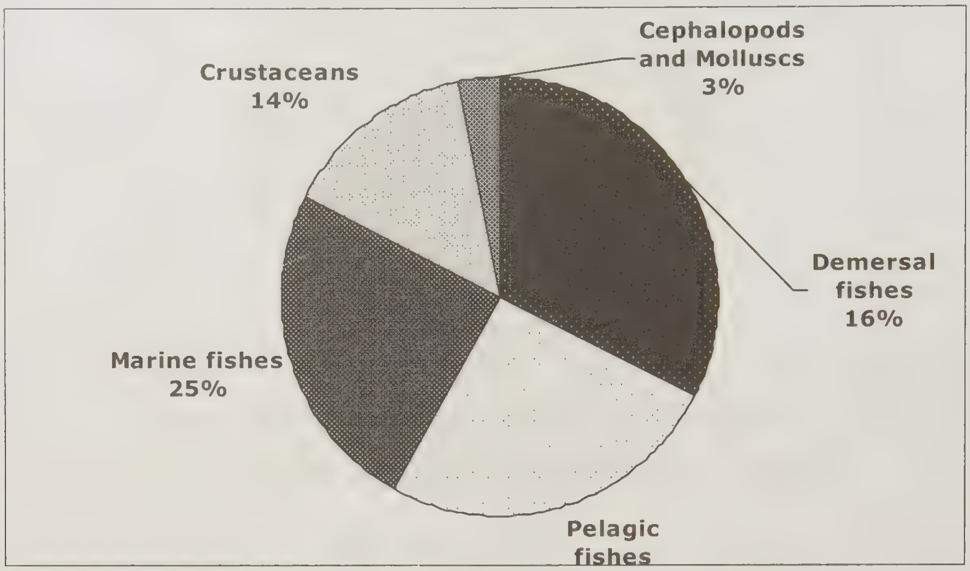

Figure 6: Composition of marine landing in 2005

Overall, during 1950-2005, landing of demersal fishes has recorded a CAGR of 3.07 percent, pelagic species 2.43 percent and marine fishes (since mid-1950s) recorded a CAGR of 9.73 percent.

1.1.6 Location of fisheries

India has vast inland water resources in the form of rivers and canals (0.2 million km), reservoirs (3.1 million ha) and tanks and ponds (2.2 million ha) offering tremendous scope for fish production. The extensive network of Indian rivers (45 000 km) constitutes one of the major inland fisheries resources of the country and serves as a primary habitat for the rich germplasm of carps, catfishes, featherbacks, etc. (Tables 6 and 7).

Table 6: Inland fisheries resources of India

Sl. no.	State/UTs	Rivers & canals (km)	Reservoirs ('000 ha)	Tanks & ponds ('000 ha)	Floodplain lakes & derelict water ('000 ha)	Brackish water ('000 ha)	Total water bodies ('000 ha)
1	Andhra Pradesh	11 514	234	517	-	60	811
2	Arunachal Pradesh	2 000	-	276	42	-	318
3	Assam	4 820	2	23	110	-	135
4	Bihar	3 200	60	95	5	-	160
5	Goa	250	3	3	-	Neg.	6
6	Gujarat	3 865	243	71	12	100	426
7	Haryana	5 000	Neg.	10	10	-	20
8	Himachal Pradesh	3 000	42	1	-	-	43
9	Jammu & Kashmir	27 781	7	17	6	-	30
10	Karnataka	9 000	440	290	-	10	740
11	Kerala	3 092	30	30	243	240	543
12	Madhya Pradesh	17 088	227	60	-	-	287
13	Maharashtra	16 000	279	59	-	10	348
14	Manipur	3 360	1	5	4	-	10
15	Meghalaya	5 600	8	2	Neg	-	10
16	Mizoram	1 395	-	2	-	-	2
17	Nagaland	1 600	17	50	Neg	-	67
18	Orissa	4 500	256	114	180	430	980
19	Punjab	15 270	Neg	7	-	-	7

Sl. no.	State/UTs	Rivers & canals (km)	Reservoirs ('000 ha)	Tanks & ponds ('000 ha)	Floodplain lakes & derelict water ('000 ha)	Brackish water ('000 ha)	Total water bodies ('000 ha)
20	Rajasthan	5 290	120	180	-	-	300
21	Sikkim	900	-	-	3	-	3
22	Tamil Nadu	7 420	570	56	7	60	693
23	Tripura	1 200	5	13	-	-	18
24	Uttar Pradesh	28 500	138	161	133	-	432
25	West Bengal	2 526	17	276	42	210	545
26	A & N Islands	115	1	3	-	120	124
27	Chandigarh	2	-	Neg	Neg	-	0
28	Dadra and Nagar Haveli	54	5	-	-	-	5
29	Daman and Diu	12	-	Neg	-	Neg	0
30	Delhi	150	4	-	-	-	4
31	Lakshadweep	-	-	-	-	-	0
32	Pondicherry	247	-	Neg	1	Neg	1
33	Chhattisgarh	3 573	84	63	-	-	147
34	Uttaranchal	2 686	20	1	0	-	21
35	Jharkhand	4 200	94	29	-	-	123
	Total	195 210	2907	2414	798	1240	7359

Table 7: Profile of the major river systems in India

Sl. No.	River System	Main Rivers	Approximate length (km)	States
Himalayan or Extra - Peninsular Rivers				
1.	Ganga	Ganga	2 525	Uttar Pradesh, Bihar, West Bengal
		Ramganga	569	Uttar Pradesh
		Gomti	940	Uttar Pradesh
		Ghaghra	1 080	Uttar Pradesh, Bihar
		Gandak	300	Bihar
		Kosi	492	Bihar
		Yamuna	1 376	Punjab, Haryana, Delhi, Uttar Pradesh
				Madhya Pradesh, Uttar Pradesh,
		Chambal	1 080	Rajasthan
				Uttar Pradesh
		Tons	264	Uttar Pradesh
		Son	784	Madhya Pradesh
		Ken	360	
2.	Brahmaputra	Brahmaputra, Dibang, Siang, Lohit, Manas, Buri, Dihang, Dhansri, Koppili	4 000	Arunachal Pradesh, Assam, Nagaland, Sikkim, Manipur
3.	Indus	Jhelum	400	Jammu & Kashmir
		Chenab	330	Jammu & Kashmir, Himachal Pradesh
				Himachal Pradesh, Punjab
		Beas	460	Himachal Pradesh, Punjab
		Satluj		Jammu & Kashmir, Himachal Pradesh, Punjab
		Ravi		
Peninsular Rivers				
4.	East Coast	Mahanadi	851	Orissa, Madhya Pradesh
		Godavari	1 465	Maharashtra, Andhra Pradesh
		Krishna	1 401	Maharashtra, Andhra Pradesh, Karnataka
				Karnataka, Tamil Nadu
		Cauvery	800	Karnataka
		Bhima	861	
5.	West Coast	Narmada	1 322	Maharashtra, Gujarat, Madhya Pradesh
		Tapti	720	
		Mahi	583	

Source: Central Inland Fisheries Research Institute (ICAR), Barrackpore

The country has a long coastline of 8 118 km and an equally large area under estuaries, backwaters and lagoons, etc. The continental shelf area amounts to 5 300 000 sq. kms of which 71 percent area is available in the Arabian Sea (west coast) and the remaining 29 percent in the Bay of Bengal (east coast). After declaration of the Exclusive Economic Zone (EEZ) in 1977, the area available to India is estimated at 2.02 million km^2, comprising 0.86 million km^2 on the west coast, 0.56 million km^2 on the east coast and 0.60 million km^2 around the Andaman and Nicobar Islands (Figure 7).

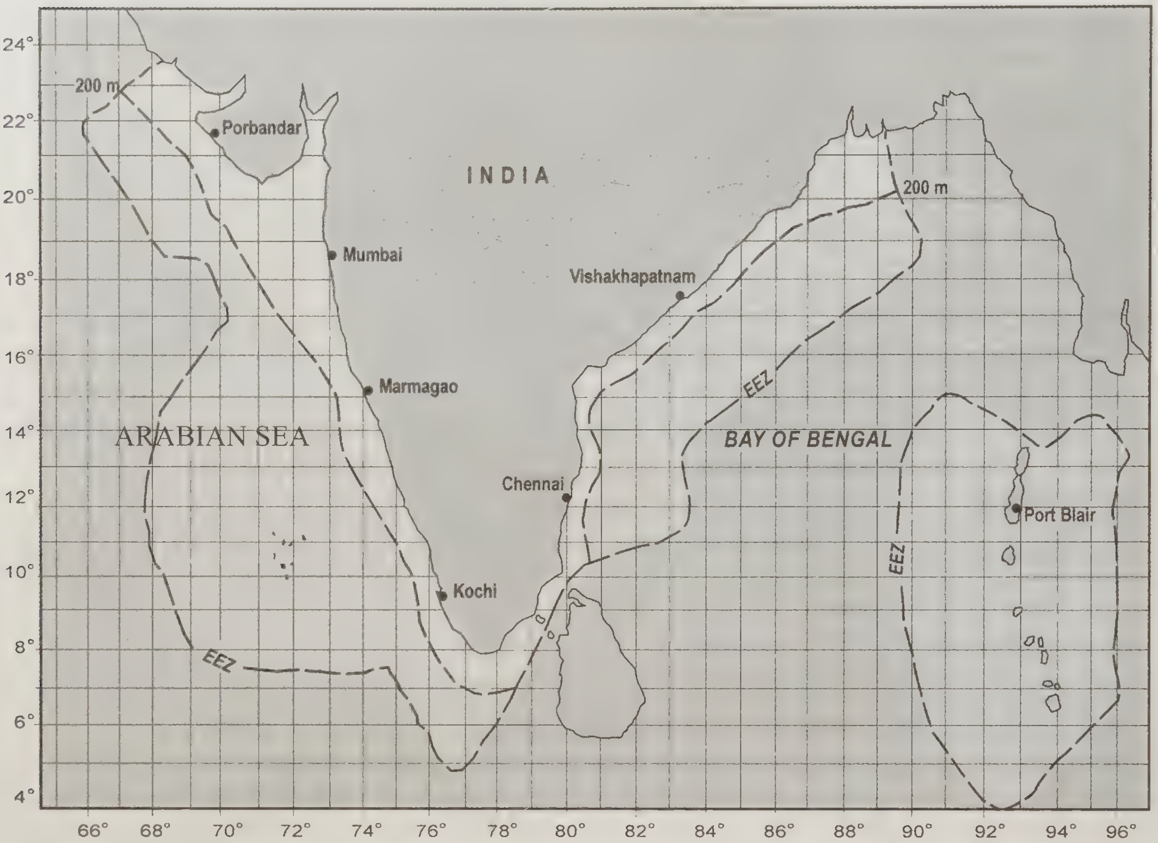

Figure 7: Exclusive economic zone of India

Riverine fisheries

Both the Ganga and the Brahmaputra river systems harbour Indian Major Carps (*C. catla, L. rohita, C. mrigala*), which are the key species responsible for increased production from ponds and tanks in the last three decades. However, the catch statistics over the years indicate that the biologically and economically desirable fish species, including the Indian Major Carps have started giving way to low-value species, exhibiting an alarming swing in the population structure. The average yield of major carps in the river Ganga has declined from 26.62 to 2.55 kg/ha/year during the last four decades. Studies have shown that environmental aberrations like marked reduction in water volume due to increased sedimentation and water abstraction, accompanied with river course modifications and irrational fishing practices are the key factors responsible for the decline in riverine fish production.

Reservoir fisheries

Optimisation of fish yields from reservoirs in India has received some importance only recently and the fish yield from the resource is still frustratingly low. Presently, they yield an average of about 15 kg/ha/yr in contrast to 88 kg/ha/yr in Russia, 100 kg/ha/yr in Sri Lanka and 600 kg/ha/yr in China. A production of 50-100 kg/ha/yr can easily be realized from large (>5000 ha) and medium (1 000–5 000 ha) reservoirs by adoption of suitable mesh size, balanced fishing effort and sustained stocking support. The small reservoirs (<1 000 ha), having a total area of 1.48 million ha in the country, have the potential to yield 200–300 kg/ha/yr. Even a moderate increase of 100 kg/ha for small and 75 kg/ha for medium and 50 kg/ha for large reservoirs can provide an additional increment of about 0.150 million tonnes of fish annually (Table 8).

Table 8: Present yield and potential of production from different categories of reservoirs in India

Category	Total available area (ha)	Present		Potential	
		Average production (kg/ha)	Fish production (tonnes)	Average production (kg/ha)	Fish production (tonnes)
Small	1 485 557	49.90	74 129	100.00	148 556
Medium	527 541	12.30	6 488	75.00	39 565
Large	1 140 268	11.43	13 033	50.00	57 013
Total	3 153 366	29.70	93 650	77.70	245 134

The reservoir fisheries is largely guided by economic considerations rather than biological principles, the result being a poor understanding of biological and limnological functions governing the production regimes of the reservoirs. Multiplicity of agencies owning and manning the reservoirs has further compounded the problem by adopting irrational norms, with little concern for the enhancement of fisheries.

Coastal fisheries

Coastal fisheries in India remained in a pre developed phase until 1962 (pre-mechanization period; with the annual average production during 1950–1962 being <0.8 million tonnes), a prolonged growth phase until 1988 (intensive mechanization phase; annual production during 1963–1988 being 0.8 to 1.8 million tonnes); followed by the fully exploited coastal areas and the annual production being 1.8 to 2.8 million tonnes/ year). Fishing effort has increased steadily throughout the three phases of development, more so in the fully exploited phase. Marine fishing activity in India is an example of uncontrolled fisheries in the initial phase and inefficiently managed fisheries in the subsequent phases.

Coastal aquaculture

For the past two decades or so, development of brackish water aquaculture has been one of the most outstanding features of the fisheries sector in the country. It has been primarily responsible for almost doubling the shrimp production in recent years, and has also resulted in substantial economic gains in the coastal States of the country.

The potential brackish water area available in the coastal regions of the country for shrimp culture is estimated between 1.2 million to 1.4 million hectares. Presently, an area of about 184 115 ha is under farming with an average production of about 110 000 tonnes of shrimp per year. The average productivity has been estimated at about 1 000 kg per hectare per year. Since the development of this sector, about 0.3 million persons have gained direct employment in shrimp farming and about 0.6–0.7 million persons are employed in the ancillary units and activities. The area under culture has also increased from 135 582 ha in 1996–97 to 184 115 ha in 2005–06.

Cultured shrimps (mainly *Penaeus monodon* or popularly known as black tiger) contribute about 50 per cent of the total shrimp exports. About 91 per cent of the shrimp growers in the country have a holding between 0 to 2 ha, 6 per cent between 2 to 5 ha, and the remaining 3 per cent have an area of 5 ha and above. The infrastructure facilities established over years include hatcheries both in private and public sector, laboratories for testing of pathogens/ diseases and processing units.

Until early nineties shrimp culture was completely dependent on the seed collected from the natural resources. With the increase in farming area and increased stocking rates shrimp hatcheries were established in large numbers in the private sector. Presently, there are 237 shrimp hatcheries along the coastline of the country with a production capacity of 11.0 billion of post-larvae (PL) per annum.

Deep sea fisheries

The Indian EEZ is an open access realm for Indian nationals and only possession rights exist. There are no property rights. Deep-sea fishing is viewed in a state of diminishing fleet strength of vessels above 23 m overall length (OAL). There numbers have come down from about 180 in the early nineties to about 60 now. Lack of research and development efforts on fishing vessels best suited to the Indian conditions has also impeded he growth of this sector. Mechanized vessels below 20 m OAL necessitate major inputs in their design not only to increase their voyage but also to facilitate bringing back the catch in as good condition as possible. While new hull material such as fibre- reinforced plastic (FRP) is being used by the industry, standards are still lacking, resulting in poor quality vessels.

Potential yield

The potential fish production in India, as per the current estimate, is 8.40 million tonnes per annum. Potential yield from inland fisheries[6] and marine fisheries are estimated at 4.50 million tonnes per annum and 3.92 million tonnes per annum respectively. At the aggregate level, India is presently exploiting 78 percent of its potential yield comprising 83 percent of potential yield in inland fisheries and 72 percent of potential in marine fisheries.

Presently, the reservoirs in India have the potential of 0.25 million tonne per annum, whereas only 38 percent of its potential is exploited. With proper policy interventions, this sector can develop the fisheries economy to a large extent.

In the coastal fishery, the west coast of India has a potential yield of about 2.36 million tonnes comprising demersal fishery resources of about 1.25 million tonnes and pelagic fishery resources of about 1.11 million tonnes. On the other hand, the east coast of India has a potential yield of about 1.09 million tonnes comprising demersal fishery resources of about 0.66 million tonnes and pelagic fishery resources of about 0.43 million tonnes (Table 9). At the aggregate level, the potential yield for demersal fishes is 1.929 million tonnes, for pelagic fishes 1.742 million tonnes, and for oceanic fishes 0.246 million tonnes.

Table 9: Potential yield from continental shelf of India

Region/ Resource	West coast	East coast	Lakshadweep Islands	Andaman and Nicobar	Total
Demersal	1.251	0.656	-	0.022	1.933
Pelagic	1.106	0.434	0.063	0.139	1.742
Oceanic					0.246
Total	2.357	1.09	0.063	0.161	3.921

1.1.7 Methods of harvesting

The marine fishing fleet comprises about 280 491 fishing craft of which 225 862 are of traditional types (including about 44 578 motorized traditional craft). The mechanized fishing fleet comprises 29 241 trawlers, 983 purse seines, 14 183 gill-netters, 8 862 dol-netters and 1 020 other type of boats (Table 10).

Table 10: Fishing craft operating in the coastal States and Union Territories

Sl. no.	State/Union Territory	Traditional crafts	Motorized traditional crafts	Mechanized boats	Total
1	Andhra Pradesh	53 853	4 164	8 642	66 659
2	Goa	1 094	1 100	1092	3 286
3	Gujarat	9 222	5 391	11 372	25 985
4	Karnataka	19 292	3 452	2 866	25 610
5	Kerala	28 456	17 362	4 206	50 024
6	Maharashtra	10 256	286	8 899	19 441
7	Orissa	10 993	2 640	1 276	15 854
8	Tamil Nadu	33 945	8 592	9 896	52 433
9	West Bengal	4 850	270	3 362	8 482
10	Andaman and Nicobar Islands	1 180	160	230	1 570

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[6] Potential from inland fisheries is a variable concept. Since the total amount of area under reservoirs, pond and other water bodies may vary with time, a definite potential cannot be estimated. The figure given here may be best described as potential yield at this point of time.

Sl. no.	State/Union Territory	Traditional crafts	Motorized traditional crafts	Mechanized boats	Total
11	Daman and Diu	252	350	805	1 407
12	Lakshadweep	594	306	478	1 378
13	Pondicherry	7 297	505	560	8 362
	Total	181 284	44 578	53 684	280 491

Total includes 810 FRP Catamarans and 135 Beach Landing Crafts

As seen by the number of traditional craft and small-mechanized vessels, the major fishing activities are still concentrated in the areas within 0 to 70–80 meter depth zone. As compared to the west coast, concentration of traditional craft (including motorized) is more on the east coast (about 57 percent of the total). In the case of mechanized vessels, the trend is reverse. The scale of mechanization is also reflected in the total fish landings of the two coasts.

At the national level, the mechanized sector contributes about 67 percent of the landing. In 1969 it was a mere 20 percent. Motorized sector contributes about 25 percent and the balance 8 to 10 percent is contributed by the traditional crafts. With the advent of mechanization, use of traditional harvesting gear like bag net, cast net, small meshed gill net has declined and more efficient gear like purse seines have became popular. Table 11 shows the harvesting methods of some commercially important fish species in the country.

Table 11: Harvesting methods for some commercial varieties of fin and shellfish species

Species	Gear
Indian oil sardine	Purse seine, ring seine gillnet
Mackerel	Gillnet, ring net, trawlnet, purse seine
Bombay duck	Dol net, trawlnet
Carangids	Trawlnet, gillnet, hooks and line
Whitebaits	Ring seine, Trawlnet
Seer fishes	Gillnet, trawlnet, hooks and line
Tunas	Gillnet, hooks and line
Shad	Gillnet
Anchovy	Trawlnet, dol net
Ribbon fishes	Trawlnet
Pomfrets	Gillnet, trawlnet
Sharks	Hooks and line, gillnet, trawlnet
Rays	Hooks and line, bottom set gillnet
Threadfin breams	Trawlnet
Catfishes	Purse seine, trawlnet, gillnet, dol net
Croakers	Trawlnet, bottom set gillnet, bag net
Silverbellies	Trawlnet
Goatfishes	Trawlnet
Threadfins	Trawlnet
Rock cods	Hooks and line, bag net, trawlnet
Flatfishes	Trawlnet
Big-jaw jumper	Trawlnet
Penaeid shrimps	Trawlnet, dol net, trammel net
Non-penaeid prawns	Trawlnet, dol net
Crabs	Trawlnet, bottom set gillnet
Lobster	Trawlnet, bottom set gillnet, bag net
Cephalopods	Trawlnet, hooks and line

1.2 Fisheries Management Frameworks

1.2.1 Mandate and authority

Entry 57 of List I of Seventh Schedule of the Constitution of India specifies Fishing and Fisheries beyond Territorial Waters as Union Subject, whereas Entry 21 of List II speaks of Fisheries as a State Subject. Reading both the Entries together, it follows that control and regulation of fishing and fisheries within territorial waters is the exclusive province of the State, whereas beyond the territorial waters, it is the exclusive domain of the Union. The Central Government acts as a facilitator and coordinator responsible for policy formulation, carrying out fishery research and channelling funding support to the states in line with the national priorities and the commitments made to the state/ UT governments. The Ministry of Agriculture (Department of Animal Husbandry, Dairying and Fisheries) within the purview of its allocated business helps the coastal states and UTs in development of fisheries within the territorial waters, besides attending to the requirements of the sector in the EEZ. Therefore, management of fishery exploitation in the EEZ requires close coordination between the Union and the states.

1.2.2 Fisheries legislation

For sustainable development of the marine resources, India amended its constitution in 1976. The Indian Parliament enacted the Territorial Sea, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Acts in 1976, pursuant to which a 200 nautical mile EEZ was established with effect from January 15, 1997. Since then, India has also enacted a number of other laws and regulations, including: the Marine Products Export Development Authority Act, 1972; the Indian Coast Guard Act, 1978; the Maritime Zones of India (Regulation of Fishing by Foreign Vessels) Act, 1981; the related Rules of August, 1982; the Environment Protection Act, 1986; the Coastal Aquaculture Authority Act, 2005, etc. The other central legislations, which have important bearing on the fisheries sector include the Merchant Shipping Act, 1956 and the Wildlife Protection Act, 1973. However, there is still no law to regulate the Indian-owned fishing vessels operating in the EEZ.

The Marine Fishing Regulation Act (MFRA) of the maritime state/ UT governments and the deep sea fishing schemes as provided under the Maritime Zone of India (Regulation of Foreign Fishing Vessels) Act, 1981 of the Government of India provide for prohibition of fishing by mechanized fishing vessels in the areas earmarked for the traditional and small-motorized crafts. For monitoring the fishing activities to be carried out in different assigned fishing zones by respective fleets, patrol boats are provided under a Central Scheme to the Department of Fisheries (DoF) of the maritime states. The resources monitoring surveys conducted by the Fisheries Survey of India (FSI), Mumbai are being linked with the management measures to be evolved and applied for sustainable development of fisheries in the country.

The inland fisheries sector is regulated through the provisions of the Indian Fisheries Act, 1897, which has been repealed by the inland states as their own Act. However, a model bill for regulation of inland fisheries and aquaculture is under consideration of the Central Government.

1.2.3 Institutional structure

As defined by the Indian constitution, both the Union and the state government agencies manage fisheries activities. While at the Central-level, the Department of Animal Husbandry, Dairying and Fisheries in the Ministry of Agriculture is the focal point, in the state/UT governments, it is the DoF. Other Ministries/Departments like the Ministry of Commerce and Industries, Ministry of Earth Sciences, Ministry of Food Processing Industries, Ministry of Environment and Forests play important role in various aspect of management. At the national level, the Ministry of Defence through the Indian Coast Guard is also associated with the management of fisheries in the EEZ.

Role of Central Government

The Fisheries Division in the Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture acts as the focal point for fisheries development and management in the country. It formulates the strategy for the national development plans for the sector and issues policy guidelines for fisheries development and management. It also provides technical and financial assistance for fisheries development and management to various states/UTs. The financial assistance is over and above the budgetary support provided to the states by the Planning Commission.

To promote export of fish and fish products, the Government of India established the Marine Products Export Development Authority (MPEDA) under the Ministry of Commerce and Industry in 1972. While the processing aspect fall under the Ministry of Food Processing, the control of marine biodiversity and marine pollution falls under the jurisdiction of Ministry of Environment and Forests and the Ministry of Earth Sciences. Table 12 give the detailed institutional structure for fisheries management in India.

Table 12: Institutional set up for fisheries management in India

Item	Agency/ Ministry/ Department
Deep Sea fishing (List I) Survey & assessment of fisheries resources Research Training & extension Aquaculture development	Ministry of Agriculture / Department of Animal Husbandry, Dairying and Fisheries/ Indian Council of Agricultural Research Fisheries Survey of India
Monitoring of fishing by foreign vessels (List I) Prevention of marine pollution by ships Protection of endangered species (Wildlife Protection Act, 1972)	Ministry of Defense / Coast Guard
Fish processing Processing units	Ministry of Food Processing Industries/ Ministry of Commerce & Industries Marine Products Export Development Authority (MPEDA) National Fisheries Development Board (NFDB)
Seafood exports (List I) Quality control	Ministry of Commerce & Industry – MPEDA Export Inspection Council
Law of the Sea negotiations (List I)	Ministry of External Affairs
Potential fishing zones Monitoring ocean pollution	Ministry of Earth Sciences
Fishing vessel industry (List I) Major fishing ports (List I) Minor fishing ports (List II)	Ministry of Shipping, Road Transport and Highways/, Ministry of Agriculture, State Governments
Aquaculture in inland and territorial waters (List II) Sustainable development of coastal aquaculture (Coastal Aquaculture Authority Act, 2005) Fisheries in territorial waters (List II)	State Governments / Department of Fisheries/ NFDB/ Coastal Aquaculture Authority
Protection of marine biodiversity (List III)[7] Protection of coastal habitats (List III) Focal point for Ramsar, CITES, CMS & CBD Conventions (List III)	Ministry of Environment and Forests (MoEF)
Infrastructure	Ministry of Agriculture /Ministry of Commerce and Industries – MPEDA / NFDB

Role of the State Governments

The DoF in the state/UT governments are responsible for fisheries development and management in their respective jurisdictions. The principal objectives of the DoF are planning and development of infrastructure facilities for landing and berthing of fishing craft, creating suitable marketing facilities, implementation of various fisheries development programmes viz., channelling financial assistance for purchase of fishing implements, implementation of socio-economic programmes and interactions with the Government of India and other agencies for technical and financial assistance.

The National Fisheries Development Board

In view of optimal utilization of the fisheries resources in the country, the Government of India constituted the National Fisheries Development Board (NFDB) in August 2006. Keeping in view the multifarious requirements of the fisheries sector in the country, the Ministry of Agriculture considered the need of a committed body like NFDB with adequate resources to achieve the desired results. The Ministry also felt that an autonomous agency like NFDB would have the facility to practice effective flexibility in implementation of programmes and schemes, which is a necessity for a diverse country like India.

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[7] Concurrent List

The Board[8] has started with a corpus of INR21 000 million for implementation of various activities during the period 2007-12. The Board is mandated to spend INR6 200 million towards intensive aquaculture in ponds and tanks, INR4 000 million for reservoir fisheries, INR150 million for coastal aquaculture and INR6 000 million for infrastructure. To streamline domestic marketing, the Board will invest INR2 500 million in the coming years. About INR2 000 million will be invested in activities to promote mariculture, seaweed and sea ranching, deep-sea fishing, etc.

2. ALLOCATION OF FUNDS FOR FISHERIES MANAGEMENT ACTIVITIES

2.1 The basis of allocation of funds to fisheries management

The funds allocated to the fisheries sector in India broadly fall under (1) Non-plan expenditure and (2) Plan expenditure. Non-Plan expenditure mainly includes the salary component of the organizations. On the other hand, fisheries management falls under Plan expenditure. The Plan component includes allocation to various schemes implemented by the Central and the State Governments during the Five-Year Plan periods.

The Plan size in India depends not only on economic, but also on political considerations. The actual allocation of funds to fisheries management primarily depends on how much in funds is allocated to each Five-Year Plan. Procedurally, in the beginning of each Plan, the National Development Council sets the target and priorities of the Plan and formulates guidelines on the importance of various sectors for the Planning Commission of India. Simultaneously, the Ministry of Finance works out the amount of resources that can be allocated to the Plan. Following this, the Planning Commission forms Working Groups to review various sectors. In respect of the fisheries sector, prior to each Plan, the Planning Commission constitutes a “Working Group on Fishery” to assess the development of the sector and to identify areas of focus/ priority to be addressed in the ensuing Plan. For example, the Working Group on Fisheries for the Eleventh Five-Year Plan (2007–2012) was constituted with the following Terms of Reference (ToR)[9]:

1. *“To undertake a critical review of the progress of the on-going Central and Centrally Sponsored Schemes/ programmes in fisheries sector with reference to their objectives and targets during the Tenth Plan and to recommend their continuation/ discontinuation/ modification/ convergence and also fresh initiatives, if any with tentative investments.*
2. *To identify the various problems and constraints in the implementation of the on-going development programmes in the fisheries sector, especially in development of deep-sea fishing/ distant water fishing, fresh water and coastal aquaculture, infrastructural development including fishing harbours, fish seed hatcheries, processing and marketing network, welfare of fishers, etc.*
3. *To suggest measures including policy issues for increasing area and productivity in freshwater/ coastal aquaculture, reservoir fisheries, cold water fisheries including uniform long-term leasing of suitable water bodies, etc.*
4. *To suggest an action plan for production and standardization of adequate quantum of fish seed for freshwater and coastal aquaculture and reservoirs.*
5. *To suggest concrete measures for supplementing marine fish catch by sustainable exploitation of deep sea fishery resources, reduction of by- catch, mariculture, resource replenishment programmes like setting up of artificial reefs, etc.*
6. *To suggest necessary steps for creation of post-harvest infrastructure for fishing harbours, fish landing centers, processing and marketing network, including inland fisheries.*
7. *To suggest measures for development of non-food fisheries for pearl culture, ornamental fisheries, etc. to supplement production and income from fisheries.*

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[8] http://www.fishingchimes.com/acidwater.htm

[9] Quoted from Report of the Working Group on Fishery, Eleventh Five-Year Plan (2007).

8. *To suggest effective fisheries management measures for ban on fishing during monsoon, standardization of mesh sizes in different categories of fishing gear, conservation of aquatic biodiversity, etc. in accordance with the FAO Code of Conduct for Responsible Fisheries adopted, etc.*
9. *To review the on-going fisheries training, extension, HRD and welfare measures for fishers and suggest effective steps for strengthening HRD in fisheries and for improving socio-economic and livelihood issues, socio-economic development, etc.*
10. *To review current availability of extension and information support, institutional credit and suggest measures to augmenting the same.*
11. *Working Group may co-opt any other official/ non-official expert/ representative of any organizations member(s), if required.*
12. *The Working Group may also examine and address any other issue, which may be considered important, but not specifically spelt out in the ToRs and devise its own procedures for conducting its business including meetings."*

As can be seen from the ToRs of the Working Group, fisheries management in India is mainly concerned with:

- increasing production both in capture and culture fisheries,
- R&D support to increase production in a sustainable manner,
- human resource development,
- improving the operational efficiency of various schemes, and
- capacity building in the fisheries sector.

The Working Group after reviewing each of these aspects prepares a report for the Planning Commission, which is then circulated to the Ministry of Agriculture. Based on the report of the Working Group, the Ministry of Agriculture prepares a Work Plan and budget for review of the Planning Commission. The Planning Commission, balancing between the priorities of various sectors, decides on the budget allocation for various planned aspects of fisheries management. This process is summarized in the Figure 8.

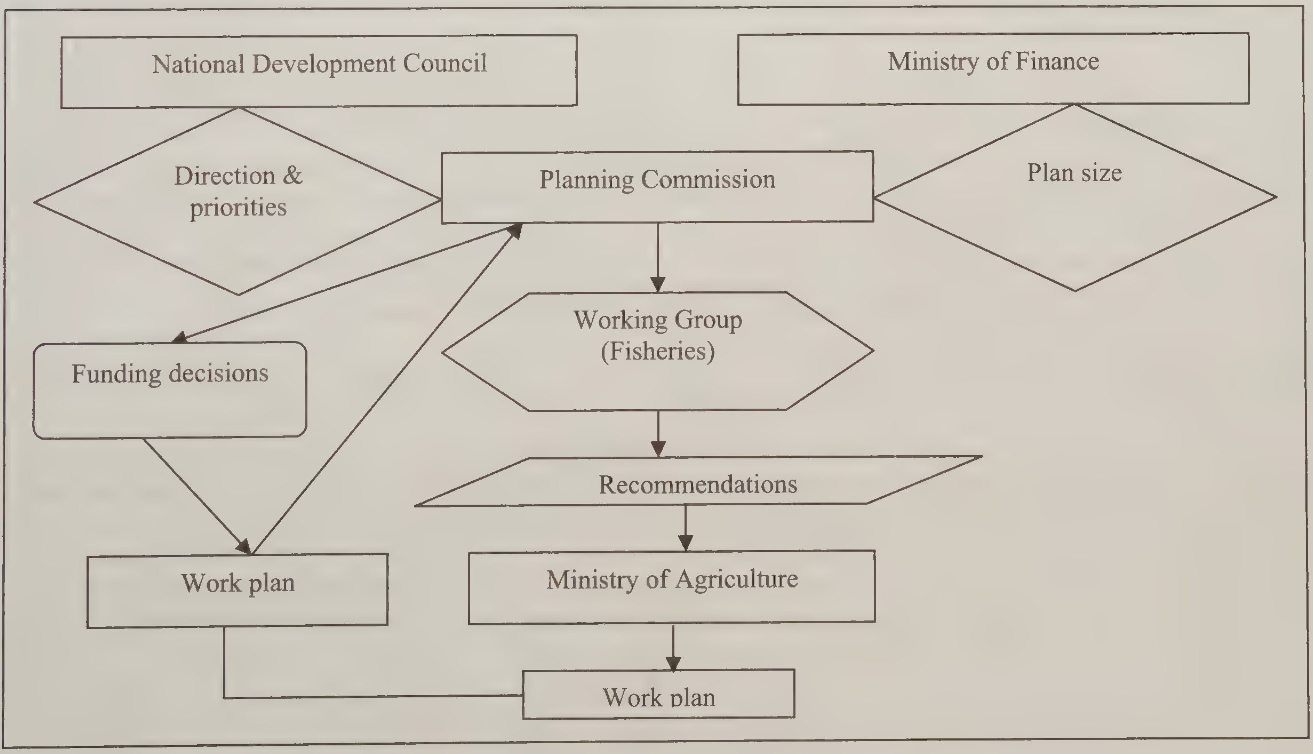

Figure 8: Procedure for allocation of funds to fisheries sector

2.2 Determinant factors in level of expenditure dedicated to fisheries

Expenditure on various aspect of fisheries management comprises two decision situations: (1) allocation of funds to various components of management (e.g. research, capacity building and human resource development, etc) and (2) allocation of funds to the states/UTs.

In each Plan period, based on the report of the Working Group, the Ministry of Agriculture at the Centre and the DoF in the states/UTs sets their own targets and identify the thrust areas to achieve the targets (Table 13). Until the 1960s, the focus of fisheries development was mainly on increasing inland fish production and improving the socio-economic conditions of the fishers. Hence, major share of funds were allocated to meet these objectives. Simultaneously, welfare schemes were also introduced.

Table 13: Developmental thrust during the Five-Year Plan Periods (1951-2007)

Five-year plans	Plan-wise developmental thrust
I	Inland fisheries and collection of spawn and fry from natural sources. Some States passed legislation for bringing neglected water bodies under fish culture.
II	Programmes initiated in the First Plan continued with added thrust on development of marine fisheries.
III	Thrust on increased fish production, mechanization of fishing vessels and programmes on improvement in the socio-economic condition of fishermen. Schemes on development of infrastructure for landing and berthing facilities for fishing vessels were introduced.
IV	Development of export potential, including setting up of an autonomous authority for export promotion. Allocation of separate outlay for fisheries research. Setting up of Special Trawler Development Fund. Setting up of Fish Farmers' Development Agencies to promote inland aquaculture.
V	Development of brackishwater fisheries, survey of marine fisheries resources, development of infrastructure facilities for coastal fishing villages, etc.
VI	Assistance for acquisition of trawlers for deep sea fishing. Development of inland fisheries statistics. Establishment of prawn hatcheries and prawn farming.
VII	Motorization of traditional fishing craft. National Welfare Fund for development of fishermen villages. Conservation of marine resources through closed season. Initiation of new Deep-sea Fishing Policy.
VIII	Strengthening of inland fish marketing, resource enhancement through artificial reefs. Fisheries training and extension. Setting up of large number of minor fishing harbours and fish landing centres. Setting up of Aquaculture Authority for regulation of shrimp farming.
IX	Acquisition of survey vessels for strengthening Fishery Survey of India. Modernization of fishing harbours and fish landing centres.
X	Strengthening of database through the National Marine Census. Manpower building. Establishment of Coastal Aquaculture Authority and the National Fisheries Development Board
XI	Under finalization

Beginning in the 1970s, the focus of fisheries development shifted to export promotion. To boost production, more funds were allocated for mechanization of fishing fleet, development of aquaculture and enhancement of infrastructure and food processing industries (primarily, these are concerned with the marine sector and aquaculture). During this period, the Government promoted the MPEDA to penetrate new export markets through product diversification. As a part of this effort, the Government through the MPEDA and the DoF also introduced new schemes on coastal aquaculture development. Table 14 shows the changes in the level of expenditure in various sub-sectors of the fisheries sector.

Table 14: Share (percent) of various sub-sectors in total plan outlay to fisheries sector

Plan	Inland	Marine	Aquaculture	Other (welfare scheme and man power training)
V	1.06	79.70	7.35	11.89
VI	4.96	78.78	10.36	5.9
VII	6.51	54.54	26.24	12.71
VIII	6.22	61.50	17.02	15.26
IX	6.69	55.71	23.60	14.00
X	Included in aquaculture	57.43	18.24	24.33

2.3 Role played by outside fisheries management agencies in the budget allocation process

"Outside agencies" implies the role played by various international organizations and lobbies, NGOs and trade associations of fishers. In India, primarily three types of outside managerial interventions have taken place in budget allocation for fisheries development: (1) incorporating environmental concerns (international organizations and NGOs), (2) subsidies and other facility to the sector (trade associations), and (3) livelihoods development of fishers (NGOs).

During the constitution of the working groups, all these groups are adequately reflected. In addition, as per the terms of reference (TORs) of the Working Group, the Group can co-opt other members if it deems necessary. In its actual working process, the Working Group co-opts members from trade associations and environment lobbies to develop acceptable strategies for sustainable development. For example, the 27-member strong Working Group for the Eleventh Five-Year Plan comprises 8 members from the industry and supporting institutions, 2 members from fisher organizations and 3 members representing international organizations.

2.4 Evaluation of expenditure and process for budget adjustments

The accounting year in India runs from 01 April to 31 March of each year. At the beginning of the year, based on the work plan, the Ministry of Agriculture forwards a budget estimate (BE) on possible expenditures to carry out activities for that year to the Ministry of Finance. By 31 October of the same year, the Ministry makes the revised estimate (RE) to record the actual expenditure on the activities.

Secondly, if funds remain unspent in a particular year, they go back to the exchequer and such unspent funds have a bearing on the allotments for the corresponding year. In actual field settings, the BE and RE are done for each scheme run by the Ministry of Agriculture and depending on utilization, the allocations change. Table 15 shows such adjustments carried out during the Tenth Five-Year Plan.

Table 15: Changes in actual allocation in schemes over the Plan Period

Sl no.	Schemes	Outlay	Actual allocation	BE 2002-03	EXP 2002-03	BE 2003-04	EXP 2003-04	BE 2004-05	EXP 2004-05	BE 2005-06
1	Central Institute of Fisheries Nautical & Engineering Training (CIFNET)	388.5	388.5	20.6	22.7	6.1	12.7	20.6	27.5	85.9
2	Central Institute of Coastal Engineering for Fishery (CICEF)	5.5	5.5	3	3	1	2.5	1		0.5
3	Integrated Fisheries Project (IFP)	56.0	56	19.1	5.5	7.1	5	8.3	6	11.4
4	Fishery Survey of India (FSI)	1 300	1 300	407.3	294	415.8	277.5	420.1	396.7	454.8
5	Fisheries & training extension	150	150	10	16.9	10	9.2	15	12.7	15
6	Strengthening of	450	245	10	5	20	13.8	150	49.9	51

Sl no.	Schemes	Outlay	Actual allocation	BE	EXP	BE	EXP	BE	EXP	BE
				2002-03	2002-03	2003-04	2003-04	2004-05	2004-05	2005-06
	database and information networking for the fisheries sector									
7	Development of marine fisheries, infrastructure and post harvest operations	2 500	2 500	150	99.7	125	79.5	460	558.4	575
8	Development of inland fisheries and aquaculture	1 350	1 350	190	111.2	160	100.5	275	211.2	250
9	National Scheme of Welfare of Fishermen	1 200	1 200	190	169.7	200	188.2	250	242.7	250
	Total	7 400	7195	1 000	727.7	945	688.9	1 600	1 505.1	1 693.6

3. EXPENDITURES ON FISHERIES

3.1 Categorization of expenditure

Categorization of expenditure for fisheries management in India's context can be: i) Central Sector Schemes: the schemes under these categories are fully financed and implemented (in some cases) by the Central government, ii) Centrally Sponsored Schemes: the financing for these schemes is shared both by the Central and the state governments, and iii) State Schemes: financed and implemented by the states.

The allocation of funds and expenditure on various schemes shows different thrust areas under each Five-Year Plan. For the purpose of this study, the allocation and expenditure in fisheries sector has been categorized under five major headings: (i) Scientific research, (ii) Policy development and operational management, (iii) Enforcement, (iv) Corporate and administrative support, and (v) Development and capacity building. However, the demarcation under the different headings cannot be clearly drawn, as many schemes comprise multiple characteristics overlapping other category(ies).

3.1.1 Scientific research[10]

The current components of fisheries research can be broadly grouped under the following organizations: (a) Indian Council of Agriculture Research (ICAR) system; (b) Ministry of Agriculture; (c) Ministry of Commerce and Industries; (d) Ministry of Food Processing Industries; (e) Ministry of Earth Sciences and (f) Other Bodies such as the Council of Scientific and Industrial Research and the State Agricultural Universities. However, the ICAR is the main organization for conducting fisheries research in the country and the following institutes form part of the ICAR system:

- Central Marine Fisheries Research Institute (CMFRI), Kochi, Kerala.
- Central Inland Fisheries Research Institute (CIFRI), Barrackpore, West Bengal.
- Central Institute of Fisheries Technology (CIFT), Kochi, Kerala.
- Central Institute of Fisheries Education (CIFE), Mumbai, Maharashtra.
- Central Institute of Brackish water Aquaculture (CIBA), Chennai, Tamil Nadu.
- Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar, Orissa.
- National Bureau of Fish Genetic Resources (NBFGR), Lucknow, Uttar Pradesh.
- National Research Centre on Cold Water Fisheries (NRCCWF), Bhimtal, Uttar Pradesh.

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[10] Fisheries and Aquaculture Research Capabilities and Needs in India – World Bank Technical paper 147 (Fisheries Series)

Tables 16 and 17 and Figure 9 show the expenditure on various schemes related to scientific research in fisheries during the different Plan Periods. Apparently, expenditure has always fallen short of outlays in the last Five-Year Plans, with the exception of the Eighth Plan – where expenditure was exceptionally higher than the outlay. During this Plan, new schemes in scientific research were introduced for which allocation of funds was not made at the time of preparing the Plan documents.

Table 16: Overview of outlay for fisheries research (INR million)

Plans	Outlays for DARE[11]	Outlay for fisheries	Outlay for fisheries as percent of DARE's outlays (%)
IV	850	22.5	2.65
V	1 535.6	96	6.25
VI	3 400	157.5	4.63
VII	4 480	182.5	4.07
VIII	13 000	650	5.00
IX	21 000	1250	5.95

Table 17: Institute-wise outlay and expenditure on fisheries (INR Million)

Institutes	Plans			
	IX		X	
	Outlays	Expenditure	Outlays	Expenditure
CIFE	292.5	234.5	492.5	460.2
CIFRI	124.2	130.6	225	151.5
CMFRI	170.8	178.7	300	206
CIFT	199.9	121.9	280	215
CIFA	109.5	128.6	210	187
CIBA	131	94.7	200	114
NBFGR	119.5	124.5	210	148
NRCCWF	64.5	59.2	117.7	89.7
Total	1 211.9	1 072.7	2 035.2	1 571.4

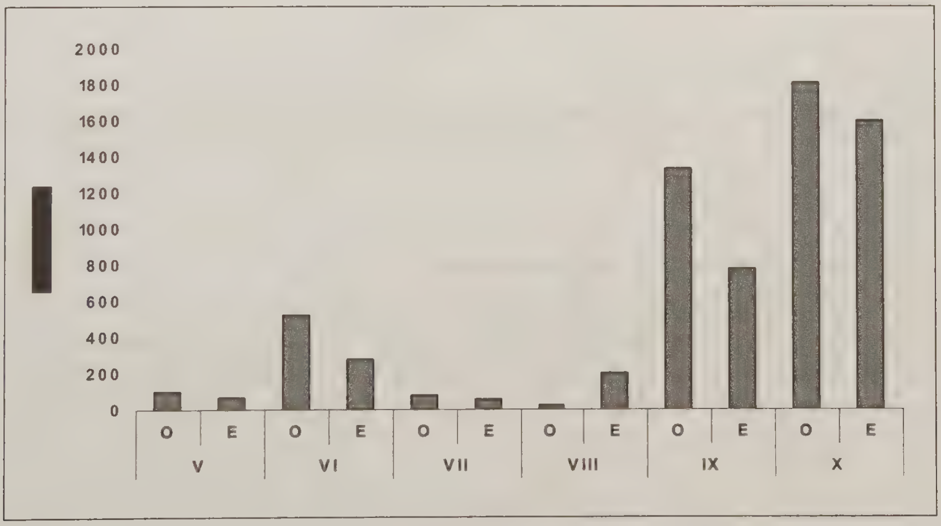

Figure 9: Outlays and expenditure on scientific research during Fifth to Tenth Five-Year Plans

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[11] Department of Agriculture Research and Education, Ministry of Agriculture.

3.1.2 Policy development and operational management

The use of policy reforms in India has been restricted to rent from the post-harvest sector, i.e. levies on export of marine products; landing and berthing fees collected from mechanized fishing vessels in some of the fishing harbours and fish landing centres (FLCs), and rent through licensing of deep-sea fishing vessels through joint venture, charter and leasing arrangements.

While the levy on export continues, the rent through licensing ceased after the government in 1997 rescinded the 1991 policy on deep-sea fishing. As regards the landing and berthing fee, there is no uniform pattern, and the rent collected from most of the fishing harbours and FLCs is meagre and not commensurate with the expenditure on the maintenance of the facility.

It is seen that policy instruments can be useful management tools to restrain/ optimise fishing effort as well as to provide a source of revenue to the government, which can be ploughed back to the fisheries sector to supplement the meagre share it often receives from Plan allocations. To sustain marine fisheries, the Government of India would have to introduce a set of fiscal reforms in the fisheries sector, which *inter alia* should include a system of limiting access and appropriate fee for the access.

With the exception of the Tenth Five-Year Plan where outlays and expenditure were actually in balance, expenditures mostly fell short of outlays in the other Plans (Figure 10).

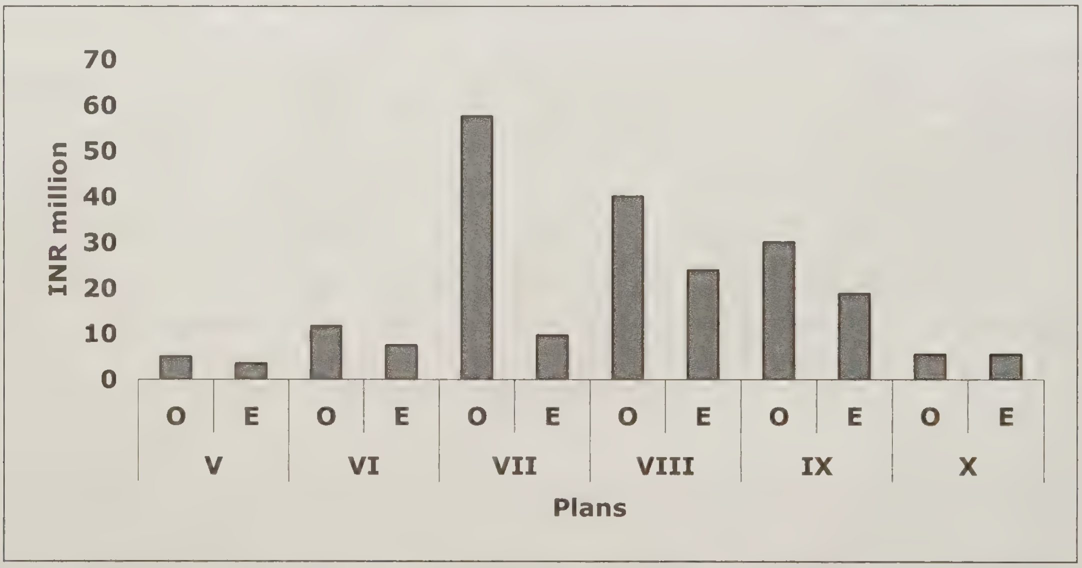

Figure 10: Outlays and expenditure on policy development and operational management during the Fifth to Tenth Five-Year Plans

3.1.3 Enforcement (monitoring, control and surveillance)

The open access nature of marine fisheries also takes us to the issue of monitoring, control and surveillance (MCS). Implementation of MCS in small-scale fisheries or in coastal areas presents a range of unique problems which relate to large numbers of widely dispersed fishers operating within a fishery, mixed gear/ species and landing points. The main objective of implementing MCS in the country is to secure responsible and sustainable management of fisheries resources while allowing an ecologically safe and economically profitable exploitation of the resources, not only for today's population but also for posterity. However, the main obstacle in the successful implementation of MCS is lack of coordination among stakeholders.

As can be seen from Table 18, allocation of funds on this aspect of fisheries management was not favoured in the government funding. In the last five Plans, budgetary provisions were made for enforcement related schemes only during the Eighth and Ninth Plans.

Some of the main controls and instruments that could be used in implementing MCS in marine fisheries in India are as follows:

1. Review of existing marine fisheries management programmes and analysis of the fisheries in the coastal waters and the EEZ (this will inter alia include the registration of fishing vessels, number and category of fishing craft and gear, fishing harbours/ fishing landing sites, boat building yards, etc.).
2. Review of the existing fishing vessel licensing and registration procedures and practices, fisheries legislation and of other concerned Ministries/ Departments (e.g. MMD), which have a bearing on the sustainability of the fisheries resources.
3. Assessment of the MCS capacity and identification of institutional development requirements within the Ministry of Agriculture and the Department of Fisheries of the coastal states/UTs and, if necessary, other concerned sister Departments (e.g. MMD).

It is expected that implementation of the MCS system will not only enhance fisheries conservation and management but will also lead to establishment of multiple channels of communication and improved safety for fishing vessels and crew.

Table 18: Outlays and expenditure on enforcement

Category	Plans			
	VIII		IX	
	Outlays	Expenditure	Outlays	Expenditure
Enforcement	350	245.2	20	15.3

3.1.4 Corporate and administrative support (marine fisheries laws and regulations)

Under the enabling provisions of the Indian Fisheries Act, 1897, various states and UTs have introduced their fishery regulations for regulating inland fisheries. For regulation of fisheries in the territorial waters, all the coastal States and the UT of Lakshadweep have enacted their Marine Fishing Regulation Act (MFRA). These Acts are based on a model bill provided by the Union Government in 1979.

The expenditure on corporate and administrative related schemes has shown satisfactory utilization as compared to aspects of fisheries management discussed above (Figure 11).

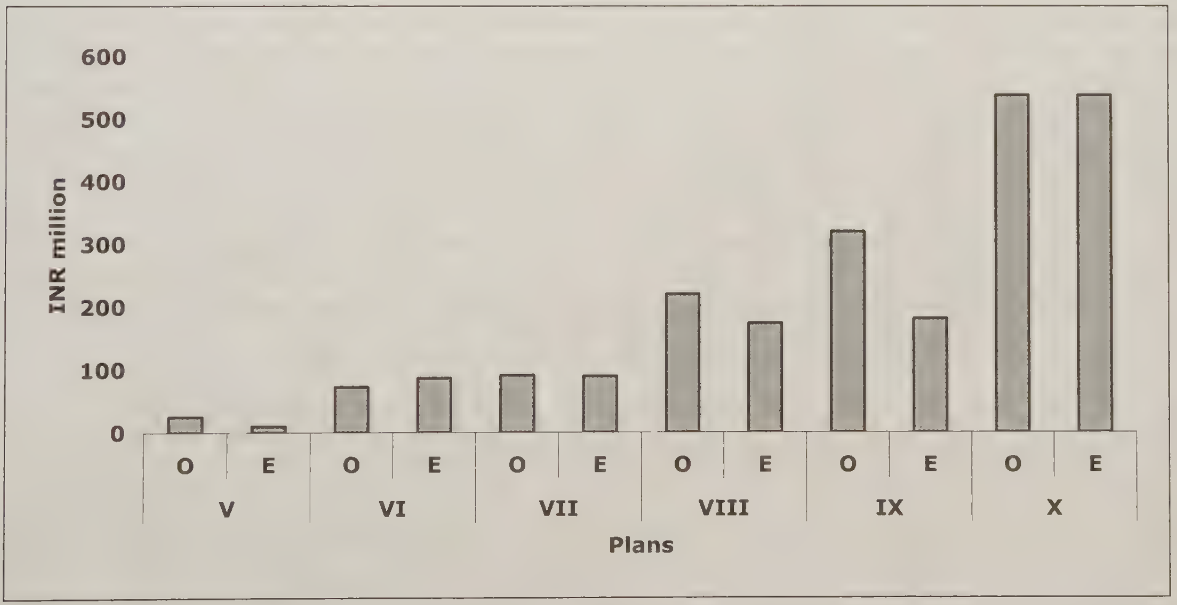

Figure 11: Outlays and expenditure on corporate and administrative support during the Fifth to Tenth Five-Year Plans

3.1.5 Development and capacity building[12]

The importance of access to essential infrastructure facilities such as fishing harbours, FLCs, ice plants and cold storages, boat building yards, net making plants, transportation and communications networks, seed production units, has been recognized as important for stimulating the growth of fisheries sector during the various Plan periods. In 1964, a Centrally Sponsored Scheme was introduced to provide infrastructure facilities for landing and berthing of mechanized fishing vessels, traditional fishing crafts and deep sea fishing vessels. The initial approach was to provide limited landing and berthing facilities such as a jetty, deepening of the entrance channel, provision of a breakwater, market hall, guide lights, etc.

Since the inception of the Centrally Sponsored scheme, six major fishing harbours, 53 minor fishing harbours and 188 FLCs have been identified for implementation. Out of which, 6 major fishing harbours, 41 minor fishing harbours and 162 FLCs have been completed and put to use. The remaining 18 minor fishing harbours and 28 FLCs are at various stages of construction[13]. During the Fifth Plan (1974-1979), the construction of major fishing harbours at Mumbai, Cochin, Chennai, Visakhapatanam and Roychowk was sanctioned. The development of fishing harbours and landing centres has subsequently continued in all the Five-Year Plans, albeit with certain modifications in the implementation of the scheme during the Ninth Five-Year Plan.

Some of the other schemes introduced for development and capacity-building included Techno-Socio-Economic Survey of Fishers, National Welfare Fund of Fishermen, Group Accident Insurance Scheme, Motorization of Traditional Crafts, Introduction of Improved Landing Crafts, Marine Fishing Regulation, Fish Farmer's Development Agency, Incentives for Small Mechanized Fishing Sector, Development of Model Fishermen Villages and Saving-cum-Relief Scheme. Implementation of these schemes has had much impact on the living conditions of fishers. The objective of Development of Fishermen Villages is to provide civic amenities like housing, potable water, recreation facilities, etc. The objective of Saving-cum-Relief for fishermen is to provide financial assistance to the fishermen during the period of ban on fishing (mostly for two months during the period April – August, which also coincides with the south-west monsoon in India). The scheme on the Fisheries Training and Extension was introduced in the Eighth Plan to provide training to fishery personnel so as to assist them in undertaking fisheries extension programme effectively.

The programmes for the welfare of fisher communities were initiated from the Sixth Five-Year Plan. Prior to that, government efforts were concentrated on expansion of production and exploitation of fish resources.

The phenomenal increase in fish production in the first three decades after independence could be attributed to the increase in the number of active fishers, introduction of mechanized vessels, motorization of traditional boats, use of synthetic gear material and extension of harbour facilities and expansion of export trade. From the 1980s onwards, the emphasis was on increases in the efficiency of craft and gear, motorization of traditional boats, exploitation of deep-sea fisheries through introduction of new mechanized boats and the use of foreign experience by allowing foreign vessels to fish in the Indian EEZ. Thus, mechanizations and motorization has been an important part of the planning process in India.

Figure 11 shows the expenditure on the schemes related to development and capacity building. Throughout the Plan periods (Tables 19 and 20), this aspect of fisheries management has received the highest amount of funds from the government sources with a share ranging from 64 to 85 percent in the total Plan expenditure.

Table 19: Outlays and expenditure for fisheries development over Plans

Plan	Central Sector		Centrally sponsored		State schemes		Total	
	O	E	O	E	O	E	O	E
I	10.0	03.8			41.3	24.0	51.3	27.8
II	37.3	18.0			85.3	72.6	122.6	90.6
III	67.2	30.3			215.5	202.9	282.7	233.2
IV	280.0	81.1	60.0	51.7	486.8	408.3	826.8	541.1
V	510.5	399.3	170.0	40.7	831.9	711.1	1512.4	1 151.1

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[12] This mainly includes funds and expenditure on infrastructure, motorization/mechanization, aquaculture development, fisher welfare, etc.

[13] Handbook on Fisheries Statistics, 2006, (pg 95).

Plan	Central Sector		Centrally sponsored		State schemes		Total	
	O	E	O	E	O	E	O	E
VI	1 371.0	755.4	366.2	288.0	1 974.2	1 826.1	3711.4	2 869.5
VII	1 565.8	1 169.3	607.5	532.6	3 291.9	3 074.0	5 465.2	4 775.9
VIII	1 390.0	1 610.1	3 000.0	2 680.2	7 663.9	6 894.3	12 053.9	11 184.6
IX	2 400.0	1 243.7	5 600.0	2 731.8	12 697.8	10 162.6	20 697.8	14 138.1
X	1 750.0	1 831.5	5 650.0	4 851.5	13 205.4		20 605.4	

Source: Working Group on Fisheries – Eleventh Five-Year Plan

Table 20 Budget utilization of fisheries sector over various Five-Year Plans

Plan	Utilization (in %)			
	Central Sector	Centrally sponsored	State schemes	Total
I	38.00		58.11	54.19
II	48.26		85.11	73.90
III	45.09		94.15	82.49
IV	28.96	86.17	83.87	65.45
V	78.22	23.94	85.48	76.11
VI	55.10	78.65	92.50	77.32
VII	74.68	87.67	93.38	87.39
VIII	115.83	89.34	89.96	92.79
IX	51.82	48.78	80.03	68.31
X	104.66*	85.87		

Source: Working Group on Fisheries – Eleventh Five-Year Plan

*Anticipated Figures

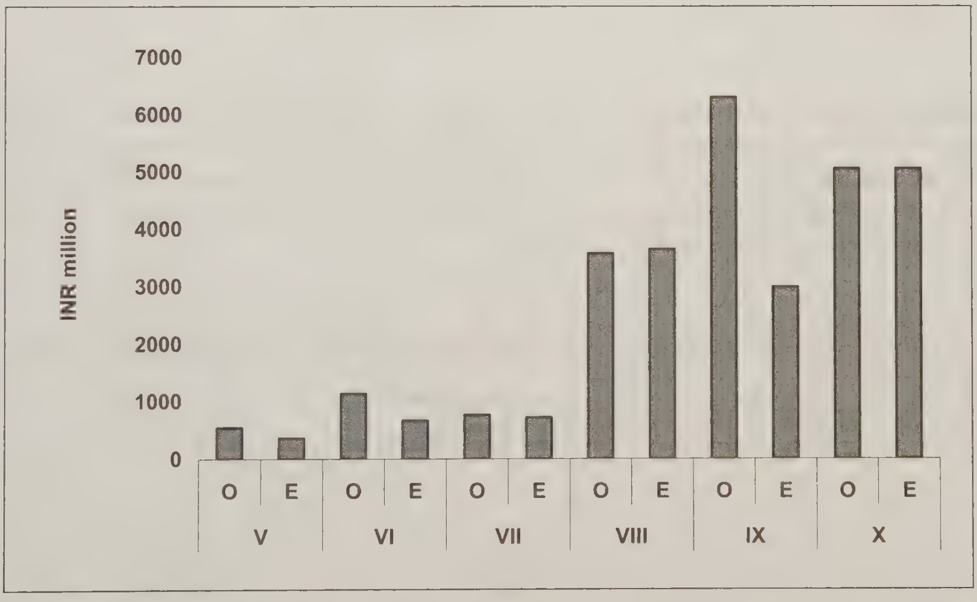

Figure 12: Outlay and expenditure on development and capacity building during the Fifth to the Tenth Five-Year Plan

3.2 Approaches followed to track expenditure

As far as planned expenditure for fisheries schemes is concerned, the Government follows the approach of utilization certificate and expenditure indicators. Broadly, the following are used as the basis for expenditure tracking for planned expenditure on fisheries: (i) financial indicators, (ii) physical indicators and (iii) utilization certificate. For each scheme, which has been financed through government sources, the implementing agency has to submit a utilization certificate at regular intervals.

Various parameters under each indicator determine the basis for expenditure tracking. For example, the scheme on Fish Farmer Development Agency includes indices like area covered, number of farmers trained, etc. The Auditing of Plan scheme also serves as an instrument for tracking the expenditure. There are two types of audits generally followed for such schemes: (a) financial audit and (b) performance audit. The financial audit also includes a local audit. The Comptroller and Auditor General of India is the prime agency for auditing of all government expenditure.

4. AN ANALYSIS OF FINANCIAL INFORMATION AND INDICATORS

It can be observed almost uniformly that there has been an increased percentage of allocation of outlay for the state schemes (Table 21). It registered a downward trend from 80.51 in the First Five-Year Plan to 53.19 percent in the Sixth Five-Year Plan. Thereafter, it recovered gradually to reach 64.09 percent in the Tenth Five-Year Plan. On average, its share in the total fisheries outlay has been approximately 64.26 percent.

Table 21: Outlays and expenditure for fisheries development over Plans

Plan	Central Sector		Centrally sponsored		State schemes		Total	
	O	E	O	E	O	E	O	E
I	10.0	03.8			41.3	24.0	51.3	27.8
II	37.3	18.0			85.3	72.6	122.6	90.6
III	67.2	30.3			215.5	202.9	282.7	233.2
IV	280.0	81.1	60.0	51.7	486.8	408.3	826.8	541.1
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X	1 750.0	1 831.5	5 650.0	4 851.5	13 205.4		20 605.4	

Source: Working Group on Fisheries – Eleventh Five-Year Plan

A close examination of the utilization of the fisheries outlay over the Plan period (Table 22) shows that it fell far short of the allocation. The magnitude of utilization varied between 54.19 percent in the First Plan to 68.34 percent in the Ninth Five-Year Plan. However, from the pattern of outlay and expenditure, it can be seen that there is a process of adjustment over the Plans as rate of utilization improved at a faster rate than increments in outlay (except Fourth and Ninth Plan).

Table 22: Budget utilization of fisheries sector over various Five-Year Plans

Plan	Utilization (%)			
	Central Sector	Centrally sponsored	State schemes	Total
I	38.00		58.11	54.19
II	48.26		85.11	73.90
III	45.09		94.15	82.49
IV	28.96	86.17	83.87	65.45
V	78.22	23.94	85.48	76.11
VI	55.10	78.65	92.50	77.32
VII	74.68	87.67	93.38	87.39
VIII	115.83	89.34	89.96	92.79
IX	51.82	48.78	80.03	68.31
X	104.66*	85.87		

Source: Working Group on Fisheries – Eleventh Five-Year Plan

*Anticipated Figures

The funds for the Central Sector Schemes, as a general trend, were less utilized than the Centrally Sponsored and the state schemes. The outlays of the Central Sector Schemes on an average constituted 24 percent of total fisheries outlays. Actual utilization of outlays of Central Sector Schemes always fell short of total allocation except in the Eighth Plan when expenditure (INR1 610.10 million) was more than allocation (INR1 390 million). Over the Plan Periods, the growth rate of outlay of Central Sector Schemes was 107.70 percent. The Fourth Five-Year Plan witnessed the lowest utilization (28.96 percent). However, if the average utilization rates of outlays of Central Sector Schemes to Centrally Sponsored schemes are compared, it turns out to be almost same, i.e. 67.48 percent and 69.00 percent respectively[14].

The Centrally Sponsored Scheme came into picture with the Fourth Five-Year Plan. When it was first introduced, about 86.17 percent of the outlay was utilized. Its utilization followed a fluctuating trend in the subsequent Plans, except in the Fifth and Ninth Plans, where the utilization was much less than the other four Plans. In the remaining four Plans, ultilization hovered between 78.65 percent in the Sixth Plan and 89.34 percent in the Eighth Plan. On an average, the ratio of the outlays of Centrally Sponsored Schemes to total fisheries outlays was about 13 percent.

5. PRODUCTION

Fish production in the country has been showing an increasing trend. The progress in the inland fisheries sector during the 1990s has been commendable (6.55 percent per annum), whereas the growth in marine fish production during the same period has been slow (2.19 percent per annum) (Tables 23 and 24).

Table 23: Fish Production (compound growth rate, percent)

4Year/ Period	Marine	Inland	Total
1950s	5.12	2.53	4.43
1960s	2.13	9.12	4.23
1970s	3.65	2.85	3.35
1980s	3.99	5.64	4.62
1990s	2.19	6.55	4.12
2000–7	3.26	9.56	6.66
1950s–007	3.70	5.72	4.54

Fisheries in the inland open waters systems have been an important source of livelihood security and nutritious protein for the growing population in the country. The inland fisheries sector has registered an impressive growth rate in the 1990s on account of production from aquaculture and surpassed the marine production for the first time in 2000–2001. Of the total inland fish production, about 75–80 percent comes from aquaculture. In inland fisheries, West Bengal leads the production table, followed by Andhra Pradesh, Uttar Pradesh and Bihar. Indian major carps contribute the bulk of production from the inland fisheries.

The multipurpose nature patter of use in inland waters has relegated capture fisheries to low priority in most of the riparian states and their importance relative to other production systems has not been given due recognition. Consequently, most of the inland open water resources have witnessed habitat degradation with

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[14] Comparison is done from the Fourth Five-Year Plan onwards as Centrally Sponsored Schemes were introduced during the Fourth Plan.

Table 24: Fish Production over Plan priods in India (1951-2004)

Plan Period	Fish Production at end of the period ('000 tonnes)			Growth (percent) over the plan period			Average annual growth
	Marine	Inland	Total	Marine	Inland	Total	
Pre-Plan Period (1951–56)	534	218	752	—	—	—	—
1st Plan (1951–56)	596	243	839	11.61	11.47	11.57	2.31
2nd Plan (1956–61)	880	280	1 160	47.65	15.23	38.26	7.65
3rd Plan (1961–66)	824	507	1 331	–6.36	81.07	14.74	2.95
Annual Plans (1966–69)	904	622	1 526	9.71	22.68	14.65	4.88
4th Plan (1969–74)	1 210	748	1 958	33.85	20.26	28.31	5.66
5th Plan (1974–79)	1 490	816	2 306	23.14	9.09	17.77	3.55
Annual Plan (1979–80)	1 492	848	2 340	0.13	3.92	1.47	1.47
6th Plan (1980 -85)	1 698	1 103	2 801	13.81	30.07	19.70	3.94
7th Plan (1985–90)	2 275	1 402	3677	33.98	27.11	31.27	6.25
Annual Plan (1990–91)	2 300	1 536	3 836	1.10	9.56	4.32	4.32
Annual Plan (1991–92)	2 447	1 710	4 157	6.39	11.33	8.37	8.37
8th Plan (1992–97)	2 967	2 381	5 348	30.42	69.83	45.44	6.49
9th Plan (1997–02)	2 830	3 126	5 956	-4.62	31.29	11.37	2.27
10th Plan (2002–03)	2 990	3 210	6 200	5.65	2.69	4.10	4.10
10th Plan (2003–04)	2 941	3 458	6 399	-1.64	7.73	3.21	3.21

Sources: i. Central Marine Fisheries Research Institute, Kochi for the period up to 1970-71. ii State Governments Union Territory Administrations since 1970-71.

accompanying low fish yields. This is best illustrated by the riverine fishery where the production is belowsubsistence level with an average yield of 0.3 tonne per km, which is only about 15 percent of their actual potential. This has also contributed to reduced employment opportunities in the rural areas along the riparian tracts in the country.

While inshore waters have been almost exploited to the sustainable levels, the contribution from deep sea and marine fisheries has been insignificant. Gujarat has emerged as the leading producer of marine fish during 2005-2006, followed by Kerala, Maharashtra and Tamil Nadu. Penaeid shrimps, which dominate the export front, are at their optimum exploitation levels, whereas tuna and cephalopods are the two least exploited fisheries owing to limited operational range of the majority of the present fishing fleets and also the lack of suitable technology. Several other species in the continental shelf are exploited only up to 70–80 m depths.

5.1 Exports

Fisheries exports from India have become an important component of agricultural exports, to the extent of 18 percent. Over fifty products are exported to as many destinations all over the world, and India has also been making a mark in ornamental fish exports in recent years.

Between the Eighth and the Ninth Five-Year Plans, the quantity of fish exports increased by 62 percent in quantity and over 117 percent in value (Table 25). It improved the share of exports in total output and enhanced the integration of the sector with the global market. A trend towards export of high value fish and retention of other fish for domestic market is seen in the recent years. Continuous monitoring of overseas markets and compliance of changing standards to remain competitive needs no emphasis. The projected target for exports from the fisheries sector by the end of Eleventh Five-Year Plan is 1.06 million tonnes in quantity and INR1 500 billion in value.

A study conducted by the National Centre for Agriculture Planning, New Delhi, indicated that although fisheries export has performed well and is quite competitive in the global market, the relative competitive advantage has declined in recent years. However, expansion in the world trade is the major determinant of fisheries export from India.

Table 25: Growth in fisheries exports and integration with international markets

Five-Year Plan	Average annual exports		Average annual production		Percent exports of production	
	Quantity ('000 t)	Value (Rs billion)	Quantity ('000 t)	Value (Rs billion)	Quantity	Value
VIII	287	309.4	4 819	1 235.9	5.95	25.03
IX	379	553.6	5 595	2 455.8	6.78	22.54
X	463	671.6	6 301	3 232.7	7.35	20.78

The future of fisheries export would be influenced by the adoption of environment-friendly fishing practices, ecolabelling and consistent compliance with food safety measures (HACCP and SPS standards). Cost of implementation of these measures has shown scale bias that has worked against smaller operators. This requires government policies and support system to be designed to minimize the cost of compliance with international standards to make smaller operators viable and export-competitive. Steps also need to be taken to devise appropriate institutional mechanisms to bring scattered small- producers and processors under a network to enable them to participate in the emerging scenario to reap the benefits of expanding global fish trade.

5.2 Training, extension and transfer of technology

The training and extension services in the fisheries sector are mainly handled by the Fish Farmers' Development Agency (FFDA) and the Brackishwater Fish Farmers' Development Agency (BFDA). Due to changes in the funding pattern of the two schemes in the Ninth Five-Year Plan, some states disbanded the FFDAs/ BFDAs and or merged them with their district-level establishments.

In the states, the DoF has presence at the lowest revenue division to take care of the fisheries development, including training and extension. However, with the closure/ merger of the FFDAs/ BFDAs, the availability of extension services to the fish farmers has been adversely affected in these states.

The research institutes and the State Agriculture Universities have also been offering training and extension work as part of their routine curriculum. The Department of Rural Development promotes fisheries through its Integrated Rural Development Programme.

6. SOURCE OF FUNDING FOR INDIA'S FISHERIES

6.1 Government funding

The sources of Government funding for fisheries sector in India are mainly Central and the state funding. In the following paragraphs glimpses on trends of outlays for fisheries sector during the various Plan Period has been presented.

The Total Plan outlays from the First Plan (1951--56) to the Tenth Plan (2002–07) have grown at 111.85 percent on average. At the beginning of the First Five-Year Plan, the total outlay was INR19 600 million (1951–56), and it rose to INR19 688 150 million in the Tenth Five-Year Plan (2002–07).

After the introduction of the New Economic Policy (1991), the total Plan outlay grew at 105.70 percent on an average. However, the average growth of the Plan outlays before the Eight Five-Year Plan was about 115 percent. This might indicate the effects of liberalisation.

Allocation of funds to a particular sector is an indication of the push given for the development of the sector. The outlay for fisheries sector as percent of outlay for the agricultural sector over the Five-Year Plans has increased from 1.45 percent in the First Five-Year Plan to about 6.52 per cent in the Sixth Five-Year Plan (Table 26). In subsequent Plans, its share hovered around 4 to 5 per cent. It shows the importance given to the fisheries sub-sector within the agriculture sector. Its share in the total Plan outlay during different Plans periods has been hovering between 0.26 and 0.52 per cent[15].

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[15] Analysis of Policies, Institutional Environment and Support Services in Fisheries – ICAR-ICLAR Project.

Table 26: Outlay for fisheries sector during Five-Year Plans (INR millions)

Plan	Period	Total outlay	Outlay for agricultural sector	Outlay for fisheries sector	Share of fisheries sector (%) of	
					Total outlay	Agricultural outlay
I	1951-56	19 600	2 940	51.3	0.26	1.74
II	1956–57	46 000	5 290	122.6	0.27	2.32
III	1961–66	75 000	10 680	282.7	0.38	2.65
IV	1969–74	159 020	27 280	826.8	0.52	3.03
V	1974–79	393 320	4 302	151.24	0.38	3.52
VI	1980–85	975 000	66 090	3 711.4	0.38	5.62
VII	1985–90	1 800 000	105 240	5 465.4	0.3	5.19
VIII	1992–97	4 341 000	224 670	12 328.2	0.28	5.49
IX	1997–2002	8 750 000	1 153 900	1 3632	0.16	1.18
X	2003–04	3 988 900	206 680	20 605.4	0.52	9.97

The Plan outlays for agriculture and allied sectors (Agricultural Research and Education, Crop Husbandry, Soil and Water Conservation, Animal Husbandry and Dairying, Fisheries, Forestry, Land Reforms, Management of Natural Disasters, Agricultural Marketing, Food, Storage and Warehousing, Investment in Agricultural Financial Institutions) have also witnessed (to some extent) trends similar to total outlays. The outlay for Agriculture and Allied Sector has, on average, increased by 83.71 percent over the Plans. The share of agriculture outlay to total outlay showed a healthy trend over the first four Plans. Since then (after the Fourth Five-Year Plan), it showed a downward trend until the Tenth Five-Year Plan. However, the linear growth rate of agriculture share to total outlays has shown a negative trend over the duration of the Plans.

In the Five-Year Plans, fisheries sector has always been a part of the agricultural sector, and its allocation was a fraction of the allotment set aside for agriculture. Since the beginning of the First Five-Year Plan, outlays for fisheries have consistently been rising (Figure 13). Average growth of fisheries outlays over the Plan period was 103.27 percent. The Fourth Plan saw the highest growth in fisheries outlays (192.46 percent), whilst in the Tenth Plan the growth was the lowest (-0.45 percent). The phenomenal growth of outlay in the Fourth Plan can be attributed to introduction of new mechanized boats.

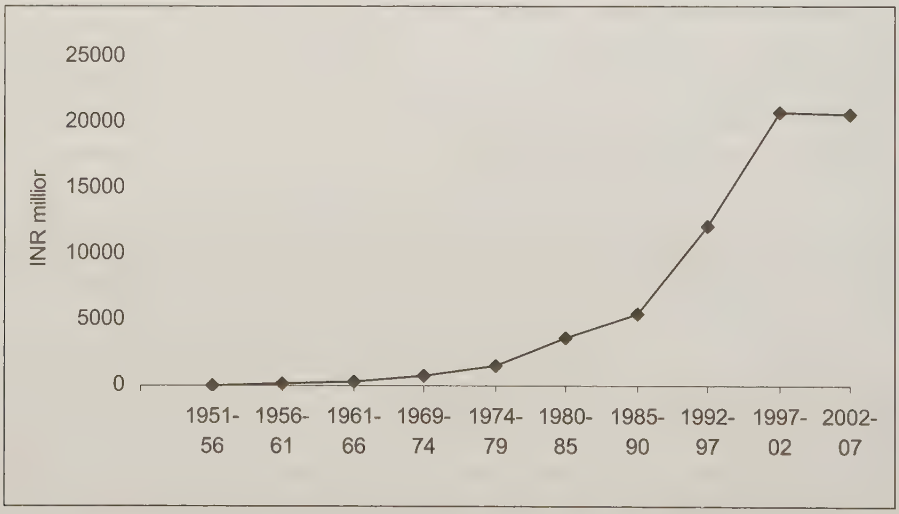

Figure 13: Outlay for fisheries sector over the Plan periods

One important observation regarding fund allocations during the Plan period is the declining share of agriculture outlay to total outlay. However, during the same period, the share of fisheries outlay in agriculture outlay has shown an overall growing trend (Figure 14 and Table 27). Albeit there are Plan-to-Plan variations, but on an aggregate basis, the data indicates a growing focus on fisheries sector.

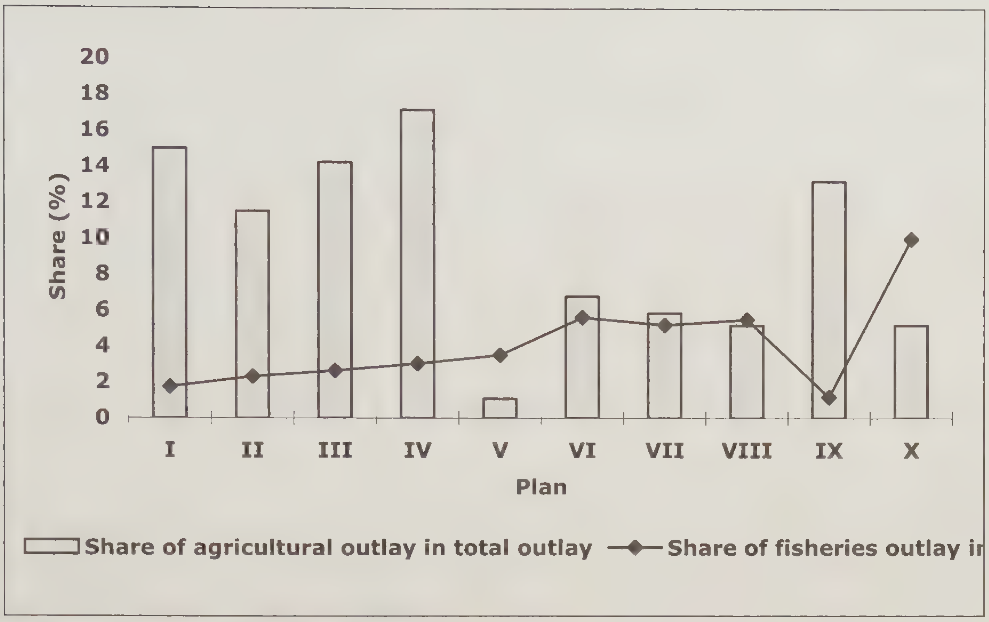

Figure 14: Outlay for fisheries percentage of total outlays and agriculture outlays over the Plan periods

Table 27: Categorized expenditure for fisheries development under various plans (INR Million)

Sl No	Categories	V		Vi		VII		VIII		IX		X	
		O[16]	E[17]	O	E	O	E	O	E	O	E	O	E
1	Scientific research	102.414	64.432	518.5	280.791	78.0	54.741	23.0	201.2	1330.0	780.7	1806	1601
2	Policy development and operational management	4.988	3.522	11.6	7.426	57.5	9.591	40.0	23.9	30.0	18.7	5.5	5.5
3	Enforcement	---[18]	---	---	---	---	---	350.0	245.2	20.0	15.3	---	---
4	Corporate and administrative support	25.011	9.953	72.5	86.566	91.0	89.408	220.0	173.8	320.0	180.8	538.5	538.5
5	Development and capacity building[19]	548.06	362.089	1134.6	668.56	764.5	721.04	3577.0	3646.2	6 300	2 986	5 050	5 050
6	Total	680.5	440	1737	1 043	991	874.8	4 210	4 290	8 000	3982	7 400	7 195

Funding from states to fisheries sector is mainly channelled to welfare funds for fishers. State-wise government outlays and expenditure is given in Table 28. As mentioned above there are two types of schemes which receive funds from state budget viz. Centrally Sponsored Schemes and State Schemes. In the

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[16] Outlay

[17] Expenditure

[18] '---' Indicates no allocation of funds.

[19] This includes funds for infrastructure, motorization/ mechanization, aquaculture development, fisher welfare, etc.

Centrally sponsored schemes, states generally have to contribute about 50 percent of the outlay, and the remaining 50 percent is matched by the Central Government).

Table 28 Outlays and Expenditure of States for fisheries during Fifth to Ninth Five-Year Plan (million)

Sl. No.	State/ Union Territory	Fifth Plan		Sixth Plan		Seventh Plan		Eighth Plan		Ninth Plan	
		O	E	O	E	O	E	O	E	O	E
1	Andhra Pradesh	49.40	44.40	140.00	155.46	214.00	237.76	980.60	162.00	518.40	198.60
2	Arunachal Pradesh	3.51	3.69	7.80	12.07	25.00	24.79	56.50	73.50	188.10	95.40
3	Assam	30.90	28.30	60.00	57.03	100.00	171.74	228.50	278.90	997.60	553.40
4	Bihar	27.40	21.30	69.60	63.04	95.00	105.07	260.50	72.50	100.00	67.20
5	Goa	19.65	18.18	40.00	31.74	50.00	44.41	100.00	64.40	79.20	68.60
6	Gujarat	76.00	77.90	200.00	191.49	242.60	210.84	370.00	362.60	1 040.00	636.70
7	Haryana	4.90	5.10	19.50	37.82	75.00	67.93	150.60	127.70	173.80	235.40
8	Himachal Pradesh	3.30	3.20	18.00	15.10	43.00	32.97	80.00	105.80	145.00	137.00
9	Jammu & Kashmir	3.60	3.70	23.00	24.23	45.00	53.42	92.00	115.50	275.00	235.40
10	Karnataka	45.50	43.90	130.30	114.51	200.00	147.05	430.00	809.80	1 105.00	521.50
11	Kerala	116.00	115.00	200.00	207.92	400.00	329.44	1 050.00	1 133.70	1 760.80	1 498.40
12	Madhya Pradesh	33.50	22.80	70.00	59.22	104.80	90.96	170.80	202.80	479.20	299.50
13	Maharashtra	55.80	39.90	120.70	147.15	160.00	178.39	291.40	273.60	418.80	513.80
14	Manipur	10.00	12.60	25.00	27.02	46.50	50.49	80.00	95.60	200.00	92.20
15	Meghalaya	5.10	4.90	9.00	11.01	18.00	20.15	35.00	41.30	140.00	52.10
16	Mizoram	1.99	2.43	6.00	7.63	10.00	17.41	22.50	33.40	45.00	58.60
17	Nagaland	4.50	3.90	7.00	10.89	30.00	35.18	65.00	57.10	200.00	71.50
18	Orissa	27.00	30.70	100.00	94.46	126.00	267.05	1046.40	526.30	541.80	695.50
19	Punjab	11.20	8.00	17.50	21.03	59.80	53.68	178.20	104.80	195.20	104.90
20	Rajasthan	10.20	10.20	22.50	18.51	40.00	27.50	95.50	59.00	77.00	37.60
21	Sikkim	2.50	2.70	10.00	7.14	12.00	8.00	15.00	15.00	20.00	17.80
22	Tamil Nadu	134.20	75.50	240.00	104.24	240.00	146.79	315.00	781.70	998.40	1 117.80
23	Tripura	9.80	10.40	33.30	41.95	60.00	114.99	220.00	188.30	198.80	163.50
24	Uttar Pradesh	7.30	8.20	65.90	95.30	125.00	123.97	215.00	238.00	280.00	302.30
25	West Bengal	95.10	86.30	270.00	201.23	617.50	391.74	791.70	616.40	1 871.30	1 821.40
26	A & N Islands	10.28	4.98	20.00	12.64	40.50	15.10	112.10	138.73	248.40	182.90
27	Chandigarh	0.11	0.11	1.00	0.93	1.74	1.72	2.60	1.69	50.00	1.90
28	Dadra & Nagar Havelli	0.10	0.02	0.50	0.00	0.50	0.31	1.00	0.53	1.10	0.30
29	Daman & Diu						13.66	20.20	20.33	32.20	31.60
30	Delhi	3.50	3.18	6.00	5.73	8.00	4.93	6.00	7.31	12.50	9.20
31	Lakshadweep	12.24	7.90	17.50	15.47	52.00	32.72	93.80	81.73	155.20	109.40
32	Pondicherry	17.30	11.74	24.10	34.13	50.00	53.90	88.00	104.26	150.00	140.30
33	Chattisgarh										45.40
34	Uttaranchal										14.30
35	Jharkhand										31.20
Total		**711.13**	**1 974.20**	**1 826.10**	**3 291.94**	**3 074.03**	**7 663.90**	**6 894.30**	**6 894.28**	**12 697.80**	**10 162.60**

6.2 Non-government funding for fisheries management activities

Non-government funding for fisheries in India is mainly related to external funding and has been increasing with participation of India in various regional bodies and with increasing assistance from international and inter-governmental organizations such as the constituents of the United Nations (FAO, UNDP, IMO, etc.), World Bank, etc.

Under institutional finance, the National Bank for Agriculture and Rural Development (NABARD), as a refinance agency for commercial banks, co-operative banks and regional rural banks, has been the major facilitator of credit to the fisheries sector. In view of the focus on deep sea fishing through charter, leasing and joint venture starting from the early eighties, and the brackishwater aqua boom in the early 1990s, many financial institutions like the Industrial Finance Corporation of India (IFCI), Industrial Development Bank of India (IDBI), Shipping Credit and Investment Company of India (SCICI), State Finance Corporations (SFCs) and National Co-operative Development Corporation (NCDC) also entered the sector to lend credit.

Credit support from financial institutes is available for almost all the activities of fisheries and for creation of infrastructure. Nevertheless, the critical role of the middlemen, merchants and occasional moneylenders in the chain is still in vogue. The present liberal status of the banking sector does hold a considerable hope for further improvement in the availability of public finance to the fisheries sector.

6.3 Review of cost recovery mechanisms[20]

Costs related to MCS and conflict management are said to have increased, although no specific data are available. The government generally believes that the financial resources directed at MCS are adequate. Participation by operators in the fisheries to cost sharing for fisheries management is minimal. License fees are levied in the mechanized sector, but fees are low, as are penalties applied for offences. These sources of revenue do not represent a significant contribution to the overall cost the Government incurs for the management of the resource.

Fishermen cooperative societies are exempted from income tax. Arguably, the most important reasons for this exemption are the following:

- Farmers are exempted from income tax, and fishing activities that are considered similar to farming operations are also exempted;
- the costs of collecting taxes in a highly disaggregated sector like the Indian fisheries sector may not justify the revenue that could potentially be collected.

Seafood exporters were exempted from income tax until recently. Exports (all agricultural commodities exported, including seafood) are charged a fee of 0.3 percent of the FOB value of seafood exports (a reduction from the initial rate of 0.5 percent). The collected tax is used for financing the MPEDA, and currently amounts to approximately US$4 million per annum. Import tariffs on seafood were 60 percent until recently; but these were reduced to 30–35 percent in 2002–03. India imports very little fish, unlike other countries in the region.

At present, the respective coastal state/UT governments only license the mechanized fishing vessels. The system of licensing needs to be extended to motorized and non-motorized craft as well. Licensing will be helpful to maintain an inventory of all categories of fishing vessels. New vessel may be permitted only as a replacement of a vessel of equal size and capacity. The priority of licensing should be shifted from a means of mere revenue earning to a system of regulating the number and type of fishing vessels. Licensing will also enable better implementation of sea safety norms in the small-scale fishing vessels.

6.4 Issues associated with ability to pay mechanism

In theory, ability to pay mechanism is possible in the marine fisheries. However, politics (such as the politics of fisher unions) and imperfection of labour markets are the major obstacles. The majority of the fishermen are small-scale and poor, which further precludes the implementation of such a mechanism.

Further, the non-payment of rent is very common, and there is no mechanism in place to penalize the defaulter. As a result, very little rent accrues from the users of the landing and berthing facilities. Due to political compulsions, it is also becoming difficult for the management bodies to rationalize the fee to enable its re-use for regular maintenance and upkeep of infrastructure facilities such as fishing harbours and the FLCs.

7. FISHERIES MANAGEMENT SERVICE PROVIDERS

7.1 Types and level of services provided by non-government sources

Several international and inter-governmental organizations, including the World Bank, UNDP, DANIDA, NORAD, DFID/ ODA (UK and Japan) provide aid to India for the development of fisheries sector. Under the FAO Bay of Bengal Programme (BOBP), started in 1979, assistance was provided for the development of small-scale fisheries and enhancing the socio-economic conditions of the fishing communities.

The ODA (now DFID) has provided technical aid for the prevention of post-harvest losses in marine fisheries. Recently, FAO launched a scheme for providing technical assistance to implement Hazard

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[20] http://www.fao.org:80/docrep/009/a0477e/a0477e0k.htm

Analysis and Critical Control Points (HACCP) in seafood processing industries. A Shrimp and Fish Culture Project was taken up with the assistance of the World Bank in May 1992 and continued until December 1999.

The role of private players is limited in fisheries management in India. The Tenth Five-Year Plan document emphasizes the importance of private/ public partnership in developing fisheries sector as:

> *"increasing public/ private investment is needed for strengthening infrastructure for diversifying fisheries and aquaculture activities and for enhancing fish production and productivity. Enhanced public investment is also required in research programmes, strengthening infrastructures for training, post-harvest, marketing, etc. Setting up of minor fishing harbours and creation of common facilities for maintenance and usage of dredgers by the Government should be given priority for improvement of infrastructure facilities in the marine fishery sector".*

India is party to a number of regional bodies, programmes and projects dealing with fisheries management and the protection of coastal habitats, communities and resources. India collects data in formalized data collection schemes, and provides regularly feed back to these regional bodies.

India also participates in programmes, inter-governmental and regional organizations that also deal with the management and conservation of fisheries resources, or the trade of fisheries products. These include:

- Bangladesh-India-Myanmar-Sri Lanka-Thailand Economic Cooperation (BIMSTEC)
- Bay of Bengal - Inter-Governmental Organisation (BOBP-IGO)
- Bay of Bengal Large Marine Ecosystem (BOBLME)[21]
- Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)
- Indian Ocean Rim Association for Regional Cooperation (IOR-ARC)
- Indian Ocean Tuna Commission
- INFOFISH, and
- The South Asian Association for Regional Cooperation (SAARC).

There is, however, no legal requirement within either state or national fisheries legislation for fisheries management issues that may be adopted by regional fisheries bodies (or other regional body) to be incorporated into national legislation.[22]

7.2 Services by fisheries participants

Trade unions and the Self Help Groups (SHGs) mainly comprise the service provider organizations. The other important participants are boat builders, input (feed, seed, etc.) suppliers, traders and moneylenders. The trade unions in capture fisheries mainly comprise the mechanized/ motorized boat owners associations. Such trade unions play a crucial role in local settings in mitigations of conflicts among the artisanal fishers and mechanized boats. They are also quite conscious about de facto demarcation of fishing areas among various fishing centres. Such trade unions have generally evolved into cooperative forms and enter in distribution of fuel for boats, price negotiations, etc.

However, for artisanal fishers there are hardly any such strong trade unions or cooperatives. Formation of SHGs, especially women SHGs are a recent trend in Indian fisheries and are significantly related to the efforts of NGOs. The SHGs are mostly associated with value addition activities in fisheries. In aquaculture, input suppliers play an influential role in determining farming practices and trade. The fish farmer is usually bound to the input suppliers through credit and advances. As extension activities by the governmental agencies are inadequate, the input suppliers/ traders also act as technical advisers to the farmers.

In the Indian context, boat building is an unregulated activity, both in terms of public interventions as well as market mechanisms. In terms of governmental intervention, there are no rules and guidelines or standard specification for boat building yards. Registration is not compulsory and technical expertise is not scrutinized. In terms of market mechanism, there is no strong association of boat builders that can act as an entry barrier. Virtually anybody with carpentry knowledge can enter the field. Especially in the east coast after the December 2004 tsunami, the number of boat building yards increased many times and produced poor quality fiber-reinforced plastic boats.

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[21] The BOBLME is still under negotiation and yet to start.

[22] http://www.fao.org:80/docrep/009/a0477e/a0477e0k.htm

One significant determinant of fisheries management is the private moneylender, though his place does not find any place in the management policy. The private moneylender acts as a cushion for fishers and fish farmers during the peak and lean periods. Since institutional credit is still lacking in terms of timely supply and amount, the fishers mostly depend on these private moneylender to manage their financing. Generally speaking, private moneylenders usually act as input suppliers in aquaculture and wholesale buyers in capture fisheries. There are many fishermen's unions, who assist the government agencies to implement various laws and regulations and other activities, and the other small groups like the SHGs and co-operative societies have been growing recently in the fisheries sector.

8. CONCLUSION

The fisheries sector in India is set in a highly diversified social, cultural and geographical environment. The diversity is amply evident in the use of technology, too, making fisheries management a challenging task. Rapid modernization of the sector and emergence of distant-water fishing has led the government to intensify its involvement in fisheries management, which has also led to increasing transaction costs on activities such as conflict resolution, MCS and safety at sea, especially of small-scale fishers.

In terms of achieving management goals, India has been successful in modernising the fishing sector and, to a large extent, especially the aquaculture sector. Fish production has increased manifold, both in inland and marine capture fisheries, and new fishing grounds are now being harvested. Aquaculture has been the main contributor to the increased production in the last one decade. The country has also emerged as an important exporter in international fish trade. Since, increasing production and export earnings were the early goals of the fisheries policy makers, it can be inferred that such policies have been quite successful.

However, there is a big question mark on the sustainability of both capture and culture fisheries in India. Marine capture fisheries are riddled with the issues of open access and over fishing. The fishery managers have also failed to pull out the traditional and small-scale fishers out of the poverty trap, and the threat to livelihoods is gradually increasing in many fishing communities along the coastline. Management is largely top-down, although a participatory approach to management is now being more overtly discussed. The challenge, therefore, lies not only in optimal utilization of the resources but also in adopting co-management approaches which can increase the role of fishers and other stakeholders in the day-to-day management of the fisheries.

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The result is recommendations and guidance as well as coverage of the discussions regarding key components of successful fisheries management regimes, the means to fund and deliver fisheries management services, and the different ways to put these practices into effect.

This document also includes the extensive background documentation prepared for the Expert Consultation about the best practices in sustainable, effective and cost effective fisheries management as well as six case studies expanding on how different countries finance fisheries management.

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